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Frontispiece

Dodd delin.t Key to Physic, and the Occult Sciences. Prattent sculp.t

A

KEY TO PHYSIC

AND THE

OCCULT SCIENCES.

OPENING TO MENTAL VIEW,

The SYSTEM and ORDER of the Interior and Exterior HEAVENS;

The ANALOGY betwixt ANGELS and the SPIRITS of MEN;

AND THE

SYMPATHY between CELESTIAL and TERRESTRIAL BODIES.

FROM WHENCE IS DEDUCED,

An obvious Diſcrimination of Future Events, in the Motions and Poſitions of the Luminaries, Planets, and Stars; the Univerſal Spirit and Economy of Nature in the Production of all Things; the Principles of ethereal and atmoſperical Influx, in conſtituting the proper Recipient of Life; the active and paſſive Tinctures requiſite in the Generation of Men and Brutes; the Properties of Vegetable, Mineral, and ANIMAL MAGNETISM; the fundamental Cauſes and Qualities, viſible or occult, of all DISEASES, both of Mind and Body; and the ſimple Modes preſcribed by NATURE for their Prevention and Cure.

TO WHICH ARE ADDED,

LUNAR TABLES, calculated from Sidereal Motion; exhibiting, upon the moſt ſimple yet unerring Conſtruction, the actual Moment of the CRISIS of every DISEASE, and the conſequent Termination thereof, whether for LIFE or DEATH.

THE WHOLE FORMING

An intereſting Supplement to CULPEPER's FAMILY PHYSICIAN, and Diſplay of the OCCULT SCIENCES. Publiſhed for the good of all who ſearch after Truth and Wiſdom; to preſerve all the Bleſſings of Health and Life; and to give to all the Knowledge of Primitive Phyſic, and the Art of Healing.

By E. SIBLY, M.D. F.R.H.S.

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DEDICATION,

TO THE NUMEROUS

SUBSCRIBERS TO MY FORMER WORKS.

THE Liberality, Attention, and Confidence, I have received from YOU, demand the earliest fulfilment of my Promise, in publishing the following Sheets. Not conscious of having deviated from the line of REASON or TRUTH, not challenged by Critics, nor accused by the Faculty, of leading you astray, I feel more than common Gratification in submitting myself once more to your Patronage; and no longer than I can render myself useful to SOCIETY, and worthy of YOUR Protection, do I wish to retain the Power of subscribing myself

Your much-honoured Brother,

Friend, and Servant,

No. 1, Upper Titchfield-ſtreet, Cavendiſh Square.

E. SIBLY.

A

KEY TO PHYSIC

AND THE

OCCULT SCIENCES.

WISDOM is the Light of Reaſon, and the Bond of Peace. It aſſimilates Man to God, and elevates his mind above unworthy purſuits. It is the principal excellence which diſtinguiſhes him from brutes, and the chief ornament that dignifies his character. Whatever is found in Wiſdom's laws defies the mouldering hand of Time, and ranks with immortality. Hence it is that a thirſt after knowledge is natural to man; and, if the cares and follies of this world could be eſtranged from his concerns, his deſire of information would be inſeparable from his exiſtence. Ignorance and Superſtition may be conſidered as the curſe of God, which chains its votaries to unworthy objects; whilſt, on the contrary, Wiſdom and Underſtanding provide us with wings, whereby to ſoar above the earth; to contemplate the works of creation; to diſcern the myſteries of divinity, and converſe with angels.

The beautiful deſcription given by Solomon of his acquirements in wiſdom, is highly deſerving the attention of all men; but particularly of thoſe who profeſs the ſcience of phyſic, and the cure of ſouls. *I prayed*, ſays Solomon, *and underſtanding was given me; I called upon God, and the ſpirit of wiſdom came to me. All good things came with her, and innumerable riches in her hand.* Wiſd. vii. 7, 11. What greater reward could any one deſire? And though the intellectual faculties of all men are not alike ſtrong and apt for occult ſpeculations; yet it is manifeſt

that all perſons are capable of deriving great improvement from reading; and, that it is not ſo much the want of natural ability, as of induſtry and application, that ſo many men diſgrace the image of the Deity, and degrade the venerable profeſſions of Divinity, Phyſic, and Law.

It rarely happens that the want of intellect, or natural endowments of the mind, are the rocks on which men ſplit in their profeſſional character. Indocile and unapt indeed muſt that man be, whom education, experience, obſervation, reading, or enquiry, will not ſet generally right in his progreſs through life. Yet, without induſtry, and an anxious deſire of knowledge and improvement, neither education, nor all the advantages of natural ability, can ſave us from the wreck of error, or the diſgrace of ignorance. Obſtinate men, though of the firſt capacity in the world, are a forlorn hope, and often irrecoverably loſt, by unadvifedly purſuing the phantom of their own brain; whilſt others, enriched by dignity of ſenſe, and qualified by depth of underſtanding to form the brighteſt characters amongſt ſociety, ſurrender up their talents for diſcernment and enquiry, and content themſelves with taking upon truſt whatever they ſee or hear; particularly in the practice of phyſic, in the law, and in the church. The miſchiefs attendant on this general conduct of mankind, are great and many; for by thus implicitly ſubſcribing to the vague notions, and falſe doctrines, of others; by ſhutting their eyes againſt the light of reaſon and enquiry, and refuſing to receive the conviction of their own ſenſes, they transfer error from one generation to another, until the unlettered multitude, dazzled by the ſplendid ignorance of the learned few, become diſciples to their miſtakes, and make error and enthuſiaſm an hereditary diſeaſe.

Hence, then, we ſee the neceſſity of conſulting our own reaſon, and employing our own underſtanding, in the diſcrimination of all our temporal and eternal affairs; and of acting and judging for ourſelves on all occaſions which immediately regard our health, our happineſs, or our life; and under all thoſe afflictions and misfortunes wherewith we ſtruggle in this world, in our paſſage to a better; to one more glorious and permanent; the ultimate end and reward of all our labours! Our ſenſes, on theſe occaſions, are ever ready to ſupport our endeavours, and perform their office; and it is unqueſtionably the duty of all men to exerciſe, to improve, and employ them. Yet it is aſtoniſhing in general to ſee how diſtruſtful we are of thoſe very faculties Nature has given us for our guide, and how fondly we ſubmit to the opinions of others, whoſe nerves cannot feel for us, and whoſe judgment is often founded upon erroneous principles, and ſometimes on no principles at all. This, however, is a conduct by no means fitted to the dignity and office aſſigned to man; who, being placed at the head of all God's works upon earth,

walking

walking in his image, and exercising dominion over his creatures, is bound to improve that intellect of reason and understanding, whereby he is to govern and direct them, according to the dictates of truth, of justice, and of mercy. For this purpose he ought, like Solomon, to study the occult properties and qualities of all things: "from the cedar-tree that is in Lebanon, even unto the hyssop that springeth out of the wall;" with whatever relates to a proper knowledge of himself, "and of beasts, and of fowls, and of creeping things, and of fishes"—not to worship the sun, nor the moon, nor the stars, nor any of the host of heaven; but to consider, to admire, and to investigate their characters, fixed by the hand of God for signs and for seasons, and for days and years. They, in fact, contain no more than what every man ought to be acquainted with, to the best of his abilities; because they lead to a comprehensive idea of those occult causes and effects, which act the most, though they are the least seen; and whereby the human understanding is enlightened and improved, and the mind enriched with those divine precepts, which lead to a manifestation of that FIRST and Omnipotent CAUSE to whose power all second causes are subservient, and operate but as the agents of his Will; and under whose provident care and sufferance we see, feel, move, speak, and have our being! The ten thousand blessings which result from this study, are found in our enquiries after truth, and the mysteries which surround us; of the astonishing sympathy and antipathy betwixt heavenly and earthly substances: of the wonderful harmony and construction of the celestial bodies; of the nature and qualities of our own existence, and the propagation of our species; of the occult properties implanted in all created beings; and the end for which they are and were created!

To such enquiries all men are alike competent, and may boast the same pretensions, unless obstinacy or indolence be substituted to prevent them. There is certainly implanted in the human mind, a power which perceives truth, and commands belief, in all the occult properties of nature, not by the force of argument, nor learning, nor science; but by an instantaneous, instinctive, and irresistible, impulse, derived neither from education nor from habit, but from the peculiar gift of Providence, acting independently of our will, whenever these objects are presented, bearing evidence of their reality, even when the pride of our external deportment, and our very words, affect to deny them. This is an intellectual sensation, which, I will venture to affirm, is felt more or less by all mankind; and I know the hearts of all my readers, if not their tongues, will admit the fact. It is therefore evident that the humble cottager, the classical curate, the regular physician, and the village doctor, stand on the same level in this respect. The study of Nature's laws, of the occult properties in medicine, and in the frame and temperature of our bodies, is no

less

leſs ſimple, than important to our welfare; and without knowing theſe, we know nothing that can place us beyond the ſagacity of the brute creation. We can neither foreſee danger nor ſhun it when it is near—we are ſubject to miſguided treatment, and miſtake, in our medical applications, and advice—we receive intuitive ſigns and tokens of misfortune or advantage, without knowing how to benefit by the admonition.—In ſhort, without this ſtudy, our enquiries are vain—our perceptions are clouded—our views limited, and all our purſuits are vanity, vexation, and diſappointment. The weakneſs of our reaſon, and the avocations ariſing from the infirmities and neceſſities of our ſituations, require the moſt powerful inſtructions, and the cleareſt perceptions of heavenly and earthly things, for the preſervation of our ſouls and bodies, and for the illumination of our minds; advantages that can in no wiſe be more completely obtained than by an intimate acquaintance with the Occult Sciences; or, in other words, by a contemplation

OF GOD.

THOUGH God has given us no innate ideas of himſelf, yet, having furniſhed us with thoſe faculties our minds are endowed with, he hath not left himſelf without a witneſs; ſince we have ſenſe, perception, and reaſon, and cannot want a clear proof of him, as long as we carry any thought of ourſelves about us. To ſhow, therefore, that we are capable of knowing, that is, being certain, that there is a God; and how we may come by this certainty, I think we need go no farther than ourſelves, and that undoubted knowledge we have of our own exiſtence. I think it is beyond queſtion, that man has a clear perception of his own being: he knows certainly that he exiſts, and that he is ſomething. In the next place, man knows, by an intuitive certainty, that bare nothing can no more produce any real being, than it can be equal to two right angles. If, therefore, we know there is ſome real being, it is an evident demonſtration, that from eternity there has been ſomething; ſince what was not from eternity had a beginning; and what had a beginning muſt be produced by ſomething elſe. Next it is evident, that what has its being from another muſt alſo have all that which is in and belongs to its being from another too; all the powers it has muſt be owing to, and received from, the ſame ſource. This eternal ſource of all being, muſt be alſo the ſource and original of all power; and ſo this eternal being muſt be alſo the moſt powerful.

Again, man finds in himſelf perception and knowledge: we are certain then that there is not only ſome being, but ſome knowing intelligent being, in the world. There was a time when there was no knowing being, or elſe there has been a know-

ing

ing being from eternity. If it be ſaid, there was a time when that eternal being had no knowledge; I reply, that then it is impoſſible there ſhould have ever been any knowledge; it being as impoſſible that things wholly void of knowledge, and operating blindly, and without any perception, ſhould produce a knowing being, as it is impoſſible that a triangle ſhould make itſelf three angles bigger than two right ones. Thus, from the conſideration of ourſelves, and what we infallibly find in our own conſtitutions, our reaſon leads us to the knowledge of this certain and evident truth, that there is an eternal, moſt powerful, and knowing, being, which whether any one will call GOD, it matters not. The thing is evident; and from this idea, duly conſidered, will eaſily be deduced all thoſe other attributes we ought to aſcribe to this eternal Being.

From what has been ſaid, it is plain that we have a more certain knowledge of the exiſtence of a God than of any thing our ſenſes have not immediately diſcovered to us. Nay, I preſume I may ſay, that we more certainly know that there is a God than that there is any thing elſe without us. When I ſay, we *know*, I mean, there is ſuch a knowledge within our reach, which we cannot miſs, if we will but apply our minds to that, as we do to other enquiries.

It being then unavoidable for all rational creatures to conclude, that ſomething has exiſted from eternity, let us next ſee what kind of thing that muſt be. There are but two ſorts of beings in the world, that man knows or conceives: ſuch as are purely material without ſenſe or perception; and ſenſible perceiving beings, ſuch as we find ourſelves to be. Theſe two ſorts we ſhall call cogitative and incogitative beings; which, to our preſent purpoſe, are better than material and immaterial.

If then there muſt be ſomething eternal, it is very obvious to reaſon, that it muſt neceſſarily be a cogitative being; becauſe it is as impoſſible to conceive that bare incogitative matter ſhould ever produce a thinking intelligent being, as that nothing of itſelf ſhould produce matter. Let us ſuppoſe any parcel of matter eternal, we ſhall find it in itſelf unable to produce any thing. Let us ſuppoſe its parts firmly at reſt together; if there were no other being in the world, muſt it not eternally remain ſo, a dead unactive lump? is it poſſible to conceive that it can add motion to itſelf, or produce any thing? Matter then, by its own ſtrength, cannot produce in itſelf ſo much as motion. The motion it has, muſt alſo be from eternity, or elſe added to matter by ſome other being, more powerful than matter. But let us ſuppoſe motion eternal too; yet matter, incogitative matter, and motion, could never produce thought. Knowledge will ſtill be as far beyond the power of nothing to produce. Divide matter into as minute parts as you will, vary its figure and motion as much as you pleaſe, it will operate no otherwiſe upon other bodies

of proportionable bulk than it did before this diviſion. The minuteſt particles of matter, knock, repel, and reſiſt, one another, juſt as the greater do; and that is all they can do: ſo that, if we ſuppoſe nothing eternal, matter can never begin to be: if we ſuppoſe bare matter without motion eternal, motion can never begin to be: if we ſuppoſe only matter and motion eternal, thought can never begin to be: for it is impoſſible to conceive, that matter, either with or without motion, could have originally, in and from itſelf, ſenſe, perception, and knowledge; as is evident from hence, that then ſenſe, perception, and knowledge, muſt be a property eternally inſeparable from matter, and every particle of it. Since, therefore, whatſoever is the firſt eternal being, muſt neceſſarily be cogitative; and whatſoever is firſt of all things, muſt neceſſarily contain in it, and actually have, at leaſt all the perfections that can ever after exiſt; it neceſſarily follows, that the firſt eternal being cannot be matter. If, therefore, it be evident, that ſomething muſt neceſſarily exiſt from eternity, it is alſo as evident, that that ſomething muſt be a cogitative being. For it is as impoſſible that incogitative matter ſhould produce a cogitative being, as that nothing, or the negation of all being, ſhould produce a poſitive being, or matter.

This diſcovery of the neceſſary exiſtence of an eternal mind ſufficiently leads us to the knowledge of God; for it will hence follow, that all other knowing beings that have a beginning, muſt depend on him, and have no other ways of knowledge or extent of power, than what he gives them; and therefore, if he made thoſe, he made alſo the leſs-excellent pieces of this univerſe, all inanimate bodies, whereby his omniſcience, power, and providence, will be eſtabliſhed; and from thence all his other attributes neceſſarily follow.

Thus, a manifeſtation of the Deity is viſible in all his works. There is not the ſmalleſt part of that immenſe ſpace our eyes behold, or our imaginations conceive, that is not filled with His preſence. The worlds which revolve with ſo much order, beauty, and harmony, through the immenſity of ſpace, the ſun, moon, ſtars, and planets, are upheld by the light of his countenance; but for which they would drop from their orbs, and, plunged into the vaſt abyſs, would return to their primitive chaos. To the mercy of God we owe all the bleſſings of this life, as the reward of good and virtuous actions. To his anger, we juſtly attribute all violent concuſſions of the elements, famine, plague, peſtilence, &c. brought on a wicked and abandoned people, like the ſtorm of fire and brimſtone on Sodom and Gomorrah. The vengeance of the Deity cannot be more awfully deſcribed, than by David in his Pſalms; which ſhould act as a timely warning to thoſe atheiſts and unbelievers, and to thoſe wicked, idolatrous, and polluted, countries, againſt whoſe deteſtable crimes theſe terrible ſcourges have been ſo often ſent. The ſhaking of the earth; the trembling

trembling of the hills and mountains; the flames of devouring fire darting through the firmament; the heavens bending down with forked thunderbolts; their riding on the clouds, and flying on the wings of a whirlwind, the burſting of the lightnings from the horrid darkneſs; the tremendous peals of thunder; the ſtorms of fiery hail; the melting of the heavens, and diſſolving into floods of tempeſtuous rains; the earth opening and ſwallowing up her inhabitants; the rocks and mountains cleaving aſunder, and diſcloſing their ſubterraneous channels, their torrents of water, and bituminous fire, at the very breath of the noſtrils of the Almighty; are all of them circumſtances which fill the guilty mind with horror and diſmay, and admirably expreſs the power, the preſence, and the omniſcience, of God!

To what has been ſtated above, I would earneſtly recommend an attentive peruſal of what I have written in the firſt volume of my Complete Illuſtration of the Occult Sciences, from page 61 to 71; whence it will be manifeſt to the full conviction of the moſt obſtinate atheiſt, (if ſuch a thing can really exiſt,) that there is a God, all-powerful and intelligent; ſupremely perfect; eternal and infinite; omnipotent and omniſcient; who endures from eternity to eternity, and is preſent from infinity to infinity!

But though, from the nature and perfections of the Deity, he is inviſibly preſent in all places, and nothing happens without his knowledge and permiſſion; yet it is expreſsly revealed in Scripture, and admitted by all wiſe and intelligent authors, that he is viſibly preſent with the angels and ſpirits, and bleſſed ſouls of the departed, in thoſe manſions of bliſs called Heaven. There he is pleaſed to afford a nearer and more immediate view of himſelf, and a more ſenſible manifeſtation of his glory, and a more adequate perception of his attributes, than can be ſeen or felt in any other parts of the univerſe; which place, for the ſake of pre-eminent diſtinction, and as being the ſeat, and centre, from whence all things flow, and have their beginning, life, light, power, and motion, is called the *interior*, or *empyrean*, Heaven.

The poſition and order of this interior heaven, or centre of the Divinity, has been variouſly deſcribed, and its locality ſomewhat diſputed among the learned; but all agree as to the certainty of its exiſtence. Hermes Triſmegiſtus defines heaven to be an intellectual ſphere, whoſe centre is every-where, and circumference no-where; but by this he meant no more than to affirm, what we have done above, that God is preſent every-where, and at all times, from infinity to infinity, that is to ſay, without limitation, bounds, or circumference. Plato ſpeaks of this internal heaven in terms which bear ſo ſtrict a reſemblance with the books of Revelation, and in ſo elevated and magnificent a ſtyle, that it is apparent the heathen philoſophers, notwithſtanding their worſhipping demi or falſe gods, poſſeſſed an unſhaken confidence

fidence in one omnipotent, ſupreme, over-ruling, Power, whoſe throne was the centre of all things, and the abode of angels and bleſſed ſpirits.

To deſcribe this interior heaven, in terms adequate to its magnificence and glory, is utterly impoſſible. The utmoſt we can do, is to collect from the inſpired writers, and from the words of Revelation, aſſiſted by occult philoſophy, and a due knowledge of the celeſtial ſpheres, that order and poſition of it, which reaſon, and the divine lights we have, bring neareſt to the truth. That God muſt be ſtrictly and literally the centre, from whence all ideas of the Divine Mind flow, as rays in every direction, through all ſpheres, and through all bodies, cannot admit of a doubt. That the inner circumference of this centre is ſurrounded, filled, or formed, by arrangements of the three hierarchies of angels, is alſo conſonant to reaſon and Scripture, and forms what may be termed the entrance or inner gate of the empyrean heaven, through which no ſpirit can paſs without their knowledge and permiſſion; and within which we muſt ſuppoſe the vaſt expanſe or manſions of the Godhead, and glory of the Trinity, to be. This is ſtrictly conformable to the idea of all the prophets and evangelical writers. From this primary circle, or gate of heaven, Lucifer, the grand Apoſtate, as Milton finely deſcribes it, was hurled into the bottomleſs abyſs; whoſe office, as one of the higheſt order of angels, having placed him near the eternal throne, he became competitor for dominion and power with God himſelf! But,

> Him the Almighty Pow'r
> Hurl'd headlong flaming from th' ethereal ſky,
> With hideous ruin and combuſtion, down
> To bottomleſs perdition, there to dwell
> In adamantine chains and penal fire!
>
> *Milton, Parad. Loſt*, b. i. l. 44, &c.

The circles next ſurrounding the hierarchies, are compoſed of the miniſtering angels and ſpirits, and meſſengers of the Deity. In poſitions anſwering to the ideas of the holy Trinity, and interſecting all orders of angels, are ſeated, in fulneſs of glory and ſplendor, thoſe ſuperior angels, or intelligent ſpirits, who anſwer to the divine attributes of God, and are the pure eſſences or ſtream through which the will or fiat of the Godhead is communicated to the angels and ſpirits, and inſtantaneouſly conducted to the *Anima Mundi*. Round the whole, as an atmoſphere round a planet, the *Anima Mundi*, or univerſal Spirit of Nature, is placed; which, receiving the impreſſions or ideas of the Divine Mind, conducts them onward, to the remoteſt parts of the univerſe; to infinity itſelf; to, and upon, and through, all bodies, and to all God's works. This *Anima Mundi* is therefore what we underſtand of Nature, of Providence,

Dodd delin. *System of the Interior or Empyrean Heaven,* *Pratteni sculp.*

Shewing the fall of Lucifer.

Providence, of the preſence of God, and the fountain or ſeat of all ſecond cauſes, being, as it were, the Eye of God, or medium between God and all created things. Next to the *Anima Mundi*, is that vaſt region or expanſe, called the ethereal heaven, or firmament, wherein the fixed ſtars, planets, and comets, are diſpoſed; and wherein the celeſtial bodies, and the comets, move freely in all directions, and towards all parts of the heavens.

To illuſtrate what has been ſtated above, I have ſubjoined a plate of the Interior Heaven, with the different orders of the Spirits and Eſſences of the Divine Mind, diſtinguiſhed by their proper names and characters, in the original Hebrew text, as pointed out in Holy Writ, and in the manuſcripts of ancient and learned philoſophers. As theſe names and characters are printed at length, and fully explained, in the firſt volume of my Illuſtration of the Occult Sciences, p. 69, 70, and 71, it is unneceſſary to repeat the ſame here; but for a more perfect explanation of what is there written, the annexed plate is abſolutely neceſſary to aſſiſt the inquiſitive reader in forming a competent underſtanding of the ſubject. It will alſo appear from this plate, in what manner the rays or beams of Divine Providence paſs from the centre or ſeat of the Godhead, through all the different orders of angels and ſpirits, to the *Anima Mundi*, and from thence to all the celeſtial bodies, planets, and ſtars; to our earth, and to the remoteſt parts of infinite ſpace, conſtituting what is termed *celeſtial influx*, or that faculty in nature by which the quality and temperature of one body is communicated to another.

OF NATURE.

No one expreſſion, uſed by authors, or ſpoken amongſt men, is in general more variouſly applied, or ſo little underſtood, as the word Nature. When ſpeaking of the *nature* of a thing, we moſt commonly mean its eſſence; that is, the attributes or cauſes which make it what it is, whether the thing be corporeal or not; as when we attempt to define the nature of a fluid, of a triangle, &c. oftentimes we confound that which a man has by nature with what accrues to him by birth; as when we ſay, that ſuch a man is noble by nature. Sometimes we take nature for an internal principle of motion; as when we ſay, that a ſtone by nature falls to the ground. Sometimes we underſtand by nature, the eſtabliſhed courſe and order of things. Sometimes we take nature for an aggregate of powers belonging to the ſame body, eſpecially a living one; in which ſenſe phyſicians ſay, that nature is ſtrong, weak, or ſpent; or that, in ſuch and ſuch diſeaſes, nature left to herſelf will perform the cure. Sometimes we uſe the term nature for the univerſe, or whole ſyſtem of the corporeal works of God; as when it is ſaid of a phœnix, or any imaginary

being, that there is no ſuch thing in nature. Sometimes too, and that not unfrequently, we expreſs by the word nature, a kind of ſemi-deity, or ſupernatural ſpirit, preſiding over all things.

This general abuſe of the word nature, is by no means peculiar to the Engliſh people or language; it prevails more or leſs in all countries, and amongſt all ſects; and ſeems to have been copied from the fabulous ideas of the ancients. Ariſtotle has written a whole chapter, expreſsly to enumerate the various acceptations of the Greek word φυσις, rendered in Engliſh *nature;* and, among Latin writers, there are no leſs than fifteen or ſixteen different acceptations of the ſame word, with advocates out of number for their interpretation. The bulk of them inſiſt, that the word nature radically means the ſyſtem of the world; the machine of the univerſe; or the aſſemblage of all created beings; in which ſenſe they ſpeak of the Author of Nature; and call the ſun the *eye* of nature, becauſe he illuminates the univerſe; and the *father* of nature, becauſe he warms the earth, and makes it fruitful. Others, underſtanding the word in a more confined ſenſe, apply it to each of the ſeveral kinds of beings, created and uncreated; ſpiritual and corporeal; thus they ſay *divine* nature, *angelical* nature, and *human* nature, meaning all men together who poſſeſs the ſame ſpiritual reaſonable ſoul. In this ſenſe the ſchoolmen and divines ſay, *natura naturans*, and *natura naturata;* ſpeaking of God, who is the *natura naturans*, as giving *being* and *nature* to all others; in oppoſition or diſtinction to the creatures, who are the *natura naturata*, as receiving their nature from the hands of another.

Nature, in a ſtill more limited ſenſe, is uſed for the eſſence of a thing; according to which the Carteſians ſay, it is the nature of the ſoul to think; and that the nature of matter conſiſts in extenſion. Others more properly uſe the word Nature for the eſtabliſhed order and courſe of material things; the ſeries of ſecond cauſes; or the laws which God has impoſed on every part of the creation; in which ſenſe it is they ſay, *nature* makes the night ſucceed the day, *nature* has rendered reſpiration neceſſary to life, &c. According to which, St. Thomas ſpeaks of nature as a kind of divine art, communicated to beings, which direct and carry them to the ends they were intended for; in which ſenſe nature can be neither more or leſs than a concatenation of cauſes and effects, or that order and œconomy which God has eſtabliſhed in all parts of his creation. Others ſtill more ſtrictly conſider nature as the action of Providence, and the principle of all things; or that ſpiritual power or being, which is diffuſed throughout the creation, and moves and acts in all bodies, and gives them peculiar properties, and produces peculiar effects. In this ſenſe, our modern philoſopher Mr. Boyle conſiders nature as nothing elſe but God,

acting

acting himself according to certain laws he himself has fixed. This corresponds very much with the opinion of a sect of ancient philosophers, who made Nature the god of the universe, Το Παν, whom they conceived to preside over and govern all things; but this they acknowledged to be only an imaginary being; and that *Nature* meant no more than the qualities, or virtues, which God implanted in his creatures, but which their poets and orators had figuratively personified as a god. Hence F. Malebranche was aggravated to say, "that the *Nature* so much spoken of in the schools, is only fit to lead us back to pagan idolatry; since it taught us to understand something, which, without being God, acts continually throughout the universe;" according to which, he supposes Nature would be adored as an idol, conceived to possess an actual principle, which, in concurrence with God, was the next and immediate cause of all the changes which befal matter.

Aristotle, with a view of concentrating these ideas of nature into one point, as best adapted to the works of an infinitely-perfect and all-powerful Being, defines Nature, *principium et causa motus et ejus in quo est primo per se, et non per accidens;* which definition being mistaken by the Peripatetics and Stoics, they from hence conceived the principle of nature to be a certain spirit or virtue diffused throughout the universe, which gave every thing its motion by the invariable order of an inevitable necessity, without liberty or knowledge. This induced the idea of a *plastic nature*, which several learned modern writers have described to be an incorporeal created substance, indued with a vegetative life, but not with sensation or thought, penetrating the whole created universe, being co-extended with it, and, under God, moving matter so as to produce the phenomena which cannot be solved by mechanical laws; active for ends unknown to itself, not being conscious of its own actions, and yet having an obscure idea of the action to be entered upon. In support of this *plastic nature*, Dr. Cudworth argues thus: "Since neither all things are produced fortuitously, or by the unguided mechanism of matter, nor God himself may reasonably be thought to do all things immediately and miraculously, it may well be concluded, that there is a *plastic* or *formative* nature under him, which, as an inferior and subordinate instrument, executes that part of his providence which consists in the regular motion of matter; yet so as that there is also, besides this, a higher providence to be acknowledged, which, presiding over it, doth often supply the defects of it, and sometimes over-rule it, forasmuch as this plastic nature cannot act electively, nor with discretion." This doctrine, he conceives, had the suffrage of the best philosophers of all ages, Aristotle, Plato, Empedocles, Heraclitus, Hippocrates, Zeno, and the Stoics, and the latter Platonists and Peripatetics, as well as the chemists and Paracelsians, and several modern writers.

Now

Now I am clearly of opinion, that, notwithſtanding theſe great authors have ſo obſtinately contended for the definition of the word, and for the principles and conſtruction of Nature, yet they all in reality meant one and the ſame thing, only giving different explanations of the ſame ideas; and if their arguments are cloſely purſued, and compared with each other, they will all tend to ſhow, that the *anima mundi*, or ſoul of the univerſe, was what they meant by Nature.

This *anima mundi*, as we have before ſeen, is a medium inveſting the whole interior heavens, and conſiſts of a pure ethereal ſubſtance, or ſpirit; which, as it more immediately reſides in the celeſtial regions, is the ſecond or next cauſe, under God, that moves and governs the heavens, and heavenly bodies, ſtars, and planets; which bodies, having received their firſt exiſtence from the fecundity of the ſame ſpirit in the act of creation, are by an influx of ſympathetic rays, and by light, heat, gravity, and motion, nouriſhed and ſuſtained, upheld and continued, in the ſame regular courſe, and in the beautiful order we ſee them. From the celeſtial regions, the ſame influx of pure ethereal ſpirit deſcends into every part of the immeaſurable ſpace, and is diffuſed through the maſs of this world, informing, actuating, and uniting the different parts thereof into various ſubſtances; and being the primary ſource of life, every-where breathing a ſpirit like itſelf, it pervades all elementary bodies, and, intimately mixing with all the minute atoms thereof, conſtitutes the power or inſtrument we call Nature, forming, faſhioning, and propagating, all things, conformably to the ideas or will of the Divine Mind in the firſt act of creation. And ſo the poet:

Spiritus intus alit, totoſque infuſa per artus
Mens agitat molem, et magno ſe corpore miſcet.

The only thing that has been objected to the notion of an *anima mundi*, is, that it mingles the Deity too much with his creatures; confounds, in ſome meaſure, the workman with his work, making this, as it were, a part of that, and the ſeveral portions of the univerſe ſo many parts of the Godhead.—Yet is the ſame principle aſſerted by Seneca, Epiſt. 92. *Totum hoc quo continemur, et unum eſt, et Deus. Et ſocii ejus ſumus, et membra.* M. du Hamel thinks, that thoſe who deny it, object without a reaſon; of which every one will be ſenſible, who reads the deſcription above given, ſince it in no reſpect confounds our comprehenſion of an infinitely-wiſe and Supreme Being with that of the *anima mundi;* but, on the contrary, proves it to be as diſtinct from the Deity as are the angels and ſpirits in heaven. And we may further obſerve, from what is above premiſed, that thoſe who deny the *anima mundi* on one hand generally admit it on the other. Thus the Peripatetics have

have recourſe to celeſtial influxes, which is partly the ſame thing, in order to account for the origin of forms, and the occult power of bodies. The Carteſians have their ſubtle matter, which anſwers to the active ſpirit of the *anima mundi.* Others ſuppoſe an actuating ſpirit to flow from the ſun, and the other heavenly bodies, which is diffuſed over all parts of the world, and is the ſource or principle of life, motion, &c. which is ſtill the ſame thing. Some philoſophers, in the place of theſe, have ſubſtituted the idea of fire, or an etherial elaſtic ſpirit, diffuſed through all parts of ſpace, as the medium by which elementary bodies are nouriſhed and ſuſtained; which nearly comes to the ſame thing. Even thoſe who have contended for a *plaſtic* nature, fall in with every principle of the *anima mundi;* only they inſiſt that the *formative* power is lodged in the earth; whereas the truth is, that it dwells in the heavens, and is conveyed to the earth, to the elements, and into all matter, by the medium I have deſcribed.

I ſhall conclude this definition of Nature, with remarking, agreeable to the opinion of the ingenious Mr. Boyle, that, in order to regulate our conceptions of the word in common, and to render the application of it leſs ambiguous, we ſhould diſtinguiſh between the univerſal and the particular nature of things. *Univerſal nature* we ſhould conſider to be the aggregate of all the bodies that make up the world, under the *anima mundi,* conſidered as a principle by virtue whereof they act and ſuffer, according to the laws originally preſcribed by the Author of all things. And this makes way for the other ſubordinate notion; ſince the *particular nature* of an individual conſiſts in the general nature, but only applied to that diſtinct part or portion of the univerſe; or, which is the ſame thing, it is a particular aſſemblage of the mechanical properties of matter, motion, &c. of that ſubject which immediately engages our attention.

Of the VISIBLE and OCCULT PROPERTIES of NATURE.

HAVING thus far explained the foregoing ſubject, we come next to an inveſtigation of *Cauſes,* and their *Effects,* or the means whereby Nature acts in the fructification of the univerſe. We derive the idea of cauſes and effects from our obſervations of the viciſſitudes of things, while we perceive ſome qualities or ſubſtances begin to exiſt, and that they receive their exiſtence from the due application and operation of other beings; in all which circumſtances, that which produces is the Cauſe, and that which is produced is the Effect. There is ſuch a relation and connection between the cauſe and the effect, that we cannot have a true notion of the one, unleſs at the ſame time we have a conception of the other. So in general we ſay that a cauſe is nothing elſe but that which gives being to another

another thing, which is the effect of it, which way ſoever it happens, according to the various cauſes.

The *Firſt Cauſe*, which acts of itſelf, and of its own ſupreme power and will, is God. This is a truth ſo evident, and ſo conſpicuous, that it cannot be denied. The exiſtence of a Firſt Cauſe may be deduced from the certainty of our own exiſtence; for that we exiſt in the world, is a ſelf-evident truth; but that we came into it of ourſelves, or by caſualty, neceſſity, or chance, is abſolutely impoſſible. The ſource of our exiſtence muſt therefore be derived from ſome being, who, as the author, muſt alſo be the free principle, of that eſſence, or life, we poſſeſs. To ſay that we ourſelves were the cauſe of our being, would be ridiculous; becauſe from thence it would follow that we exiſted before we had a being; that we gave ourſelves that which we were not in the poſſeſſion of; and that the cauſe and the effect were one and the ſame thing; which is likewiſe impoſſible. It is no leſs an error to affirm that we are in the world by neceſſity; for, if ſuch were the caſe, our exiſtence would have never had a beginning, and we ſhould have been immutable and independent, and infinite in every kind of perfection; but, as theſe qualities are only applicable to a firſt cauſe, it follows that ſuch cauſe muſt be Almighty.

Thoſe who are convinced of the exiſtence of a firſt cauſe, muſt neceſſarily attribute to it all the perfections which are or can be in the world; that it is not only moſt perfect, and moſt noble, but alſo, that all the effects which it hath produced, or is capable of producing, are contained within itſelf, in the utmoſt perfection; and that every one of them is infinite, in the unity of its being; for it is neceſſary it ſhould poſſeſs the perfections of thoſe beings it hath or can produce, otherwiſe it would be ſaid to communicate that which it neither hath nor can have. The firſt cauſe would not be abſolutely perfect, if it was not Eternal; for ſo it would have had a beginning, and might have an end; and then it could not have been the firſt cauſe, inſomuch as it derives its exiſtence from that which was pre-exiſtent to it; and by conſequence this cauſe, which we ſuppoſe to be the firſt, would be a ſecond cauſe, limited in its being and perfections, as in its duration; and it would ſeem to have a dependence upon another; whereas, when we ſuppoſe it to be the firſt, all others muſt depend upon, and be ſubordinate to, it. Whence it follows, that theſe qualities muſt be inſeparable from it, independence, eternity, infinity, and ſupreme authority; andthat we cannot conceive any firſt cauſe, but at the ſame time we muſt acknowledge the exiſtence of God.

This *firſt cauſe*, which is God, muſt neceſſarily have that *perfect unity*, which admits no multiplication either of nature or perfections. Certainly if God was not one in his being, but had ſeveral natures, the number of them ought to be infinite,

and yet none of these beings in particular would be infinite, because, when the perfection of one cannot be the perfection of another, there will not be one to be found but will stand in need of the other, that is, in whom there would not be requisite that perfection which the other beings possess. Therefore we may add, that all these supposed beings would be opposite, independent, and all supreme, which is impossible; or that all would be subject to one or other of them, which is ridiculous; whence it follows, that there is but one only God, who is one in his existence, incapable of any multiplication, and who is the primary and universal cause of all things. The great number, or rather the infinity, of perfections which we apprehend to be in the first cause, is not repugnant to the Trinity, because that does not divide the being: and these perfections are but one and the same thing, though we give them several names, and consider them under several ideas, which we are forced to correct; since without that unity there would be necessarily a composition of parts, which would be the materials of the whole compound, and would precede its existence; therefore could not be the ingredients of that composition, without something else intervening. They may also be divided and separated; so that, by the dissolution of the parts, the compound would cease; which is plainly inconsistent with that idea we have of God, who is not simple in his nature, independent in his will, and every way incorruptible. The first cause is only one, and without its like, in its essence, but also one sole, and without a second, in that action by which this world was produced; and for this reason the action is called *creation*, supposing nothing but mere nothing, out of which all things were made, by the only power of God, without the help of any other, having either the quality of an agent or a subject. The world, being produced by this first cause, remains subject to the will and pleasure of it; and, in the same manner as it was produced by the sole act of this first cause, so it is preserved in the same state, by the sole influence of the same cause; which, as it did not want any help in the creation of the universe, so neither doth it stand in need of any assistance in the conservation of it. If the first cause was free in the creation of the world, thence it follows that all things were made by direction of reason and understanding, and by consequence according to a certain idea and rule: and, since the first cause operates after an independent manner, it could not have the type of its production any where else but from itself; neither could it act by a rule distinct from its own being; so that in truth God is not only the first, but the exemplary, cause of all things. For the same reason it may be said, that the first cause, which is God, is the final cause of all things; for when he, as an intelligent and free being, produced this world, he proposed to himself an end answerable to his dignity, that is, to himself and his own proper glory. So that

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the Firſt Cauſe is, neceſſarily, the ultimate end of all its effects. This is a nice ſubject, wherein all preachers and writers ſeem at a loſs; but the caſe is clear and beautiful to thoſe who purſue the leſſons of wiſdom and ſcience.

Second Cauſes are thoſe which derive the power or faculty of acting from the influence of the Firſt Cauſe. Hence the *anima mundi* is the ſeat of all ſecond cauſes, which are alſo termed natural cauſes, becauſe they have implanted in them, by the Firſt Cauſe, the occult power of diffuſing through all ſpace, and of communicating to all bodies, that univerſal ſoul, or etherial ſpirit, whereby every particle of matter is moved, and made to act upon one another, ſo as to produce the various phenomena in nature, in the animal, vegetable, and mineral, worlds; in the elements, and in the firmament of heaven. This univerſal ſpirit or cauſe acts univerſally with particular cauſes; but after a manner agreeing with the nature of every particular thing, and according to the power which was given it when it was created; which neither alters the quality of the cauſes, nor the neceſſity or liberty of their actions. This power of acting, which is communicated by ſecond cauſes, is not a quality different from thoſe things impowered to act; whence the power which the atoms have of moving in all directions doth not differ from the atoms themſelves; the power of burning or heating doth not differ from the fire to which it is inherent, unleſs it be in the manner of our conceiving things, or of ſpeaking of them according to our conceptions. So it is of an action which terminates from the cauſe to the effect, and which is nothing elſe than a certain relation, or an actual ſubordination, which is always found betwixt the cauſe and the effect. Hence we perceive that ſecond cauſes are what all philoſophers, ancient and modern, have contended for under different forms; and are neither more nor leſs than that univerſal ſpirit, or inherent law, implanted in nature at the creation, whereby all God's works are regulated and preſerved, and the ends and purpoſes of that creation conducted to God's glory and manifeſtation, and to the good of all his creatures, the ſtudy of which opens our eyes to the bright beams of true wiſdom; to the mutual harmony and dependence one thing has upon another; to the ſympathy and antipathy of material bodies; to the perceptions of ſenſe, reaſon, and intellectual viſion; to the nice faculties and exquiſite connection of ſoul and body; and ultimately to the knowledge of ourſelves, of our progreſs through this world; of our ſublunary fate and fortune; and of the things calculated to preſerve life, or to deſtroy it.

Efficient Cauſes are all thoſe actions of bodies or things, which are the agents or direct means whereby any effects are produced. Thus a painter, painting a picture, is an efficient cauſe; and the picture itſelf, when finiſhed, is the effect thereof. Efficient cauſes comprehend a number of compound or ſubordinate cauſes, which alſo

alſo contribute towards the production of their effect. If the efficient cauſe acts by a power proper to itſelf, then it is called the principal cauſe; but, if only by the force and ſtrength of another, then it is termed the inſtrumental cauſe. So we diſtinguiſh between the painter and the pencil, though both contribute to the production of the picture. Again, the ſubject whereon the agent works, or whereof the thing is formed, is called the *material* cauſe; thus the marble out of which a ſtatue is carved, is called the material cauſe; as is likewiſe the paint and canvas of a picture, as being the matter, or materials, of which they are made; the ſculptor and painter being the efficient cauſes. There is alſo an efficient cauſe in the ſun, moon, ſtars, and elements, whereby they act upon ſublunary matter, and produce a variety of effects in the fructification and phenomena of this world. From theſe ariſe neceſſary and free cauſes: the firſt of which act neceſſarily and without choice; as fire, the ſun, and all created beings, except angels and men; for they act by a free will, wherein conſiſts the eſſence of liberty. The efficient cauſe is likewiſe either phyſical, or moral; the *phyſical* is that which produces a ſenſible corporeal effect, and acts obviouſly and immediately; thus fire is the phyſical cauſe of burning, and the ſun the phyſical cauſe of heat. The *moral* cauſe alſo produces a real effect, but in things immaterial; thus, repentance is the moral cauſe of forgiveneſs. Again, we define a *phyſical* cauſe to be that which produces its effect by a phyſical virtue; and a *moral* cauſe, that which *determines* the phyſical cauſe, though not *neceſſarily*, to produce the effect: thus, the ſun is the phyſical cauſe of light; a ſtone that falls from an eminence, and fractures the ſkull, is a phyſical cauſe of death; and thus the advice, intreaty, commands, or menaces, which determine us, though not *neceſſarily*, to do, or not to do, any thing, are moral cauſes. In this ſenſe it is obvious a moral cauſe is only applicable to a free intelligent agent; and it is this notion of a moral and phyſical cauſe that is the moſt juſt, clear, and diſtinct.

Whenever the efficient cauſe applies to a free intelligent being, and acts from knowledge, all the ſubordinate cauſes concur to the production of one and the ſame effect; as for example, the painter drawing his picture is the principal cauſe; the pencil the inſtrumental; the end propoſed by the painter is the final cauſe; the idea directing the performance is the exemplary cauſe; the form and diſpoſition of its parts is the formal cauſe; the colours and the canvas are the material cauſe, as being the conſtituent matter of the work; and if the artiſt, by any accidental touch, improves his picture, like Agillaus, who labouring many days to draw a foaming horſe, and could not, in a paſſion flung his bruſh at the painting, and the thing he wanted was thus accompliſhed when it was not intended—it is termed an accidental cauſe, So that we ſee all ſubordinate cauſes are in effect under the efficient cauſe; and are ſubſervient to it, when applied by reaſon, and directed by ſkill.

Form and *formal cauſe* is one and the ſame thing; and, when we ſay there are two ſorts of forms, that is only according to our manner of conceiving things; ſo we ſay there are two ſorts of formal cauſes, the ſubſtantial and accidental. But all forms are imaginary; neither do true philoſophers acknowledge any other ſubſtance to be in natural compounds than matter, except only in man; nor any other form than the diſpoſition of the parts, becauſe all theſe forms are altogether uſeleſs. Moreover, the exemplary cauſe may be referred to the formal, becauſe it is the idea and inward form of that which we frame in our ſpirit; ſo the formal cauſe of a picture is the diſpoſition of its parts, according to the diſpoſition and ordination which it then had in the mind of the painter. The ſame may be ſaid of all rational agents which are endued with underſtanding.

There is no difference betwixt matter and a material cauſe; and there are two ſorts of material cauſes, as well as of matter. That is the *firſt matter* out of which all bodies are compoſed, and into which, by an univerſal diviſion, they may be reduced; the ſecond is nothing elſe but bodies made of the firſt, and upon which the efficient cauſes exerciſe their action. Therefore it is apparent, that there is nothing in the world but what is a compound, and that there is no compound without matter. It is alſo certain that there is nothing made without an efficient cauſe, which acts upon compounds, and deſtroys them, that of them others may be made; becauſe the matter of the firſt ſerves for the compoſition of the ſecond. The matter which goes to the compoſition of the firſt and ſecond is the *firſt matter*, or material cauſe, of the compound; and that matter which ſerves the efficient cauſe for a ſubject and patient is called the *ſecond matter*. Both of them may be an efficient cauſe; for compounds act upon one another like the elements, which drive one another backwards and forwards. That which drives another is called the agent, as that which is driven is called the patient; and if there be any thing which reſiſts it, and drives back another, this regreſs of the motion is called *re-action*. So that one and the ſame thing may be the ſubject and cauſe of motion; and that, to give and receive being the principle of agent and patient, both may happen at the ſame time, but in divers reſpects.

Efficient cauſes, in ſolid and fluid bodies, we often ſee, act in a moſt wonderful manner; and, if they were not viſible to our eyes, we ſhould ſcarcely believe any of theſe occult properties exiſted in them. Thus, the action of oil, in ſtopping the violent ebullition of various ſubſtances, is truly ſurpriſing. It is well known, that if a mixture of ſugar, honey, or the like, be boiling on the fire, and in danger of riſing over the ſides of the veſſel, the pouring in a little oil immediately makes it ſubſide. In many caſes the marking a circle round the inſide of a veſſel, in which a liquor of

this kind is to be boiled, with a piece of hard ſoap, ſhall, like a magic ring, confine the ebullition to that height, and not ſuffer it to ſtir any farther. This is wholly owing to the oil, or fat, contained in the ſoap: but there is, beſides theſe, another very important uſe of oil, on a like occaſion, which is the pouring a little of it on any metallic ſolution while making; this reſtrains the aſcent of the noxious vapours; preſerves the operator from danger; and, at the ſame time, by keeping down the evaporating matter, gives redoubled ſtrength to the menſtruum. Pliny has mentioned an extraordinary effect of oil, in ſtilling the ſurface of water when it is agitated with waves, and the uſe made of it, by the divers, for this purpoſe: *Omne*, ſays he, *oleo tranquillari, &c.* lib. ii. cap. 103. And Plutarch, in Quæſt. Natur. aſks, *Cur mare oleo conſperſum per lucidum ſit et tranquillum?* Pliny's account ſeems to have been either diſcredited or diſregarded by our writers on experimental philoſophy, till it was confirmed by ſeveral curious experiments of Dr. Franklin, which were publiſhed in the year 1774. The property of oil above mentioned has, however, been well known to modern divers and dredgers for oyſters at Gibraltar, and elſewhere. The divers in the Mediterranean, in particular, deſcend, as in Pliny's time, with a little oil in their mouths, which they now and then let out; and which, on riſing to the ſurface of the ſea, immediately renders it ſmooth, ſo as to permit the light to paſs through the water undiſturbed by various and irregular refractions. The Bermudans are enabled to ſee and ſtrike fiſh, which would be concealed from their view through the roughneſs of the ſea, by pouring a little oil upon it. And the Liſbon fiſhermen effect a ſafe paſſage over the bar of the Tagus, by emptying a bottle or two of oil into the ſea, when the ſurf is ſo great as to endanger its filling their boats. Our ſailors have alſo obſerved, that the water is always much ſmoother in the wake of a ſhip that hath been newly tallowed than it is in one that is foul. Dr. Franklin was led, by an accidental obſervation made at ſea in 1757, to attend particularly to Pliny's account; and the various informations which he afterwards received relating to it induced him to try ſome experiments on the ſubject. Standing on the windward ſide of a large pond, the ſurface of which was rendered very rough with the wind, he poured a tea-ſpoonful of oil on the water. This ſmall quantity produced an inſtant calm over a ſpace of ſeveral yards ſquare, which ſpread amazingly, and extended itſelf gradually, till it reached the lee ſide, making all that quarter of the pond, perhaps half an acre, as ſmooth as a looking-glaſs. On repeating this experiment, which conſtantly ſucceeded, one circumſtance ſtruck him with particular ſurpriſe; this was the ſudden, wide, and forcible, ſpreading of a drop of oil on the face of the water, which, he adds, "I do not know that any body has conſidered." When a drop of oil is put on a looking-glaſs, or poliſhed marble, it ſpreads very little; but

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on water it inſtantly expands into a circle extending ſeveral feet in diameter, becoming ſo thin as to produce the priſmatic colours for a conſiderable ſpace, and beyond them ſo much thinner as to be inviſible, except in its effects of ſmoothing the waves at a much greater diſtance. It ſeems, ſays Dr. Franklin, as if a mutual repulſion between its particles took place as ſoon as it touched the water, and a repulſion ſo ſtrong as to act on other bodies ſwimming on the ſurface, as ſtraws, leaves, &c. forcing them to recede every way from the drop, as from a centre, leaving a large clear ſpace. In endeavouring to account for the ſingular effects of oil, Dr. Franklin obſerves, that there ſeems to be no natural repulſion between water and air, ſuch as to keep them from coming into contact with each other.—Therefore, air in motion, which is wind, in paſſing over the ſmooth ſurface of water, may rub, as it were, on that ſurface, and raiſe it into wrinkles, which, if the wind continues, are the elements of future waves. The ſmalleſt wave does not immediately ſubſide, but in ſubſiding raiſes nearly as much of the water next to it. A ſmall power, continually operating, will produce a great action: ſo that the firſt-raiſed waves, being continually acted upon by the wind, are, though the wind does not increaſe in ſtrength, continually increaſed in magnitude, riſing higher and extending their baſes, ſo as to include a vaſt maſs of water in each wave, which, in its motion, acts with great violence. But, if there be a mutual repulſion between the particles of oil, and no attraction between oil and water, oil dropt on water will not be held together by adheſion to the ſpot on which it falls: it will not be imbibed by the water, but be at liberty to expand itſelf and ſpread on a ſurface, that prevents, perhaps, by repelling the oil, all immediate contact; the expanſion will continue till the mutual repulſion between the particles of oil is weakened, and reduced to nothing by their diſtance. Dr. Franklin imagines, that the wind, blowing over water thus covered with a film of oil, cannot eaſily catch upon it, ſo as to raiſe the firſt wrinkles, but ſlides over it, and leaves it ſmooth as it finds it. It moves a little the oil, indeed, which, being between it and the water, ſerves it to ſlide with, and prevents friction: hence the oil, dropt on the windward ſide of the pond, proceeds gradually to leeward, as may be ſeen by the ſmoothneſs it carries with it quite to the oppoſite ſide; for the wind, being thus prevented from raiſing the firſt wrinkles, which he calls the elements of waves, cannot produce waves, which are to be made by continually acting upon and enlarging thoſe elements; and thus the whole pond is calmed. Upon the whole, there is great room to ſuppoſe (notwithſtanding the partial failure of an experiment made at Portſmouth by Dr. Franklin and others), that ſeafaring people may derive advantages from uſing oil on particular occaſions, in order to moderate the violence of the waves, or to leſſen the ſurf which ſometimes renders the landing

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on a lee-ſhore dangerous or impracticable. To this purpoſe we are imformed, that the captain of a Dutch Eaſt India ſhip, being overtaken by a ſtorm, found himſelf obliged, for greater ſafety in wearing the ſhip, to pour oil into the ſea, to prevent the waves breaking over her; which had an excellent effect, and ſucceeded in preſerving her. Phil. Tranſ. vol. lxiv. part 2. p. 445, &c. It is alſo obſervable, on the coaſt of Sutherland, when the lump-fiſh abounds in ſpring, and are devoured by the ſeals, that it may be known by the ſmoothneſs of the water above the ſpot; the oil ſerving to ſtill the agitation of the waves.

Occaſional cauſe is applied to the ſoul and body of man, and are only the *occaſions*, not the direct *cauſes*, of their effects. The ſoul is not able to act on the body, nor the body reciprocally on the ſoul: to keep up an intercourſe between them, God, on occaſion of a motion of the body, impreſſes a ſenſation on the ſoul; and, on occaſion of a ſentiment of the ſoul, impreſſes a motion on the body: the motions, therefore, of the ſoul and body, are only *occaſional cauſes* of what paſſes in the one or the other. Thus, we ſay, the ſtroke, or percuſſion, is only the occaſional cauſe of the motion produced in the body ſtruck; it is God is the direct efficient cauſe. And thus the action of objects on our organs is not the efficient cauſe of our ideas and perceptions, but merely the occaſional cauſe, which determines God to act on the mind, according to the laws of the union of ſoul and body.

In a *medical ſenſe*, whatever produces a diſeaſe is called the *cauſe* thereof. This operates either by inducing a new ſtate of the ſolids and fluids, or by taking away ſomething which is abſolutely requiſite to the exerciſe of ſome function. If a cauſe pre-exiſted in ſome meaſure in the body before the effect produced, it is called an internal cauſe; but if it exiſted out of the body, and by its application to it produced the diſeaſe, it is called external.

Internal cauſes generally injure firſt the humours, and then the ſolid parts; whereas, the external cauſes affect the ſolids, and, in conſequence of that, the humours; and this holds univerſally, unleſs perhaps in ſome few diſeaſes produced by poiſon or contagion. The immediate cauſe is that which taken altogether immediately conſtitutes the preſent diſeaſe; this is always adequate, and ſufficient to the formation of the diſeaſe, whether ſimple or complicated. The preſence of this conſtitutes and continues the diſeaſe; and the abſence of it removes the diſorder, being very little different from the diſeaſe itſelf. The inveſtigation, therefore, of this is extremely uſeful and very neceſſary. The remote cauſe is that which changes the body in ſuch a manner, as to diſpoſe it for the reception of a diſeaſe upon the acceſſion of another cauſe; but it is never adequate or ſufficient to produce a diſeaſe alone; nor would that other cauſe, the accceſſion of which is neceſſary, be of itſelf ſufficient for

the production of the diſeaſe; but both muſt concur. The buſineſs of phyſic, therefore, is to eradicate both together, which, in conjunction, conſtitute the proximate or immediate cauſe. The remote cauſe inherent in the body, is called prediſponent, antecedent, and by the Greeks προηγουμενη, and conſiſts principally in temperaments, plethora, and cacochymy. The cauſe whoſe acceſſion to the remote cauſe excites, and in conjunction with it forms, the diſeaſe, is called the procatarctic cauſe, or the προφασις, or occaſion of the diſeaſe. It is ſometimes internal, ſometimes external. Theſe Boerhaave reduces to four claſſes. Firſt, the *ingeſta*, or things entering the body; ſuch as the air, aliments, drink, medicines, poiſons, ſuch things as enter by the pores of the ſkin and noſtrils; by the ſeveral paſſages of the mouth, lungs, œſophagus, ſtomach, inteſtines, &c. either in a viſible or inviſible manner; whether by ſteam, draught, deglutition, clyſter, or injection. Secondly, the *geſta*, or things acted, as motion of the whole or any part of the body, affections of the mind, reſt, both of the body and mind, ſleeping and watching. Thirdly, things retained, or excreted, whether ſalubrious, ſecrementious, or morbid. Fourthly, things applied to the body; as air, vapours, fomentations, cloths, liniments, ointments, and plaſters; together with whatever wounds, contuſes, or corrodes: all which circumſtances ſhould be well conſidered by medical men.

Of the FIRST MATTER.

ALL philoſophers agree that there is a *firſt matter*, which was produced from the beginning; and, though it can never undergo any change, yet it is to be ſeen in all the generations and corruptions which are in nature. Hence it appears, that the firſt matter exiſted before the generation of the compounds wherein it is found, and that it ſtill remains and ſurvives the corruption of it; as, for inſtance, in fire which is made of chips; the matter of the fire was in the chips, and is found partly in the fire, partly in the ſmoke, and partly alſo in the aſhes. It is agreed by all, that nothing produces nothing, and that there is not any thing in nature that can be reduced into nothing, but that the firſt principles remain in all revolutions which can happen; therefore, in reſpect of matter, we may juſtly ſay, that there is nothing new in the world ſince the creation, and that this matter in its nature is incorruptible; ſo that to explain the eſſence of this firſt matter is the only difficulty.—Ariſtotle makes it the ſubject of all forms, and nothing but a paſſive power or a mere capacity of producing them. He ſays alſo, that matter in itſelf hath neither quality nor quantity, nor any eſſence beſides that which it received from that form which perfected it: but this explication gives us no clear idea of matter, neither doth it teach us any thing of the nature of it. Thoſe were nearer the truth who ſaid that the firſt matter

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was nothing elſe but the firſt elements into which compounds by a total diſſolution are reduced; alſo that theſe elements ought to be ſimple and indiviſible, for otherwiſe the firſt elements are not ſuch as we ſuppoſe them to be. It follows from this doctrine, that neither water, air, earth, nor fire, are firſt elements, becauſe they are compounds, as by the new chemiſtry is evidently proved; therefore, we muſt look for other elements which are ſimple and indiviſible. Now, it is obvious, that ſimple and indiviſible atoms are the only firſt matter, and the principle and elements whereof bodies are compoſed: out of theſe atoms are corpuſcles made, out of theſe corpuſcles ſmall maſſes, out of maſſes greater parts, and of theſe parts greater bodies, whereof the univerſe itſelf conſiſts. And *vice verſa*, going backward analytically, the world is divided into great bodies, thoſe bodies are reduced by mortality and time into parts, parts into ſmall maſſes, maſſes into corpuſcles, and, laſtly, corpuſcles into atoms.

Of ATOMS, and their NATURE.

TO demonſtrate the exiſtence of *atoms*, we may ſuppoſe that every compound may be divided into ſo many parts as they are which make the compound; and diviſion muſt neceſſarily ceaſe when there is a failure of parts to be divided. On the other hand, there is no end of diviſion as long as there are particles to be divided; for we muſt allow, either that a body cannot be ſo exactly divided but that there always remain diviſible parts *in infinitum*, or that there are parts after a certain number of diviſions which will not admit any further diviſions. Ariſtotle holds the former, but Gaſſendus and the ancient philoſophers defend the latter; and, according to this laſt doctrine, after all the diviſions are made, nothing can remain beſides atoms, that is, indiviſible beings, which are the firſt elements of natural bodies.

I confeſs it is hard to imagine a corporeal thing to be indiviſible, becauſe we ſee nothing in this world which is not diviſible; but this makes nothing againſt atoms which are corporeal, becauſe they compoſe bodies, and are indiviſible, becauſe they are the firſt and moſt ſimple elements of bodies. Hence ariſes another difficulty, becauſe it cannot be eaſily explained after what manner a thing that is diviſible is compoſed of parts which are indiviſible. Impartial minds do not find ſo much difficulty in conceiving this matter, as thoſe do who follow the prejudices they have received; ſome people do not conſider, firſt, that there are many things which eſcape our ſenſes, and yet are moſt real; ſecondly, that which compoſes a body is not a compound, as we ſee that unity makes number, though itſelf be not a number; letters, whereof nouns and words are framed, yet are neither one or the other; the drops of water, whereof rivers conſiſt, are not rivers: ſo atoms, though they are inviſible and indiviſible

viſible, yet they compoſe bodies which are viſible and diviſible. They are alſo immutable, in order to the world's continuing in the ſame ſtate, and bodies being of the ſame nature now as formerly.

Of the PROPERTIES, MAGNITUDE, FIGURE, WEIGHT, and MOTION, of ATOMS.

AN *atom* is a corporeal being, ſimple, inviſible, and indiviſible; ſolidity conſtitutes its eſſence or eſſential property, which diſtinguiſhes it from ſpirit and vacuity, which hath no power of reſiſting. Atoms neceſſarily avoid all our ſenſes, becauſe they are compoſed of many diſtinct and groſs parts, whoſe object ought to be compoſed ere it can be perceived by the external organ; this, however, does not deſtroy the truth and reality of atoms, becauſe ſmall corpuſcles eſcape our ſenſes; as we obſerve in duſt, which ſticks to our clothes; in the corpuſcles of a ſtone, which is made hollow by drops of water; in divers occult parts in a mite, which cannot be ſeen without the help of a microſcope; and, laſtly, in ſmall corpuſcles which are ſeen to move in a chamber by the ſun-beams: we may omit many others that are ſmaller, which, without doubt, we could ſee if our ſight were more acute.

Though atoms are moſt ſubtle and imperceptible, yet they have their particular extenſion, magnitude, and figure, from whence their differences ariſe: for the figure of ſome of them is round, as the atoms of water, oil, and quickſilver; others have cubicular figures, ſuch as the atoms of ſea-water; and others are pyramidal, as thoſe whereof nitre conſiſts; there are ſome which have ſharp points like needles, as thoſe of fire; whence we have to ſuppoſe there are others variouſly figured. This difference is neceſſary to diſtinguiſh compounds: and as theſe atoms, as to their ſolidity or inviſibility and indiviſibility, (which are their inſeparable properties,) are alike, ſo alſo, if they did not differ in their figure and thickneſs, all bodies would be alike.

Weight is the principle of the ſaid natural motion, inaſmuch as it doth reſiſt a violent motion. I mention this, that we may know whether motion in atoms hath an internal or external principle, or whether weight be determined only to one motion, or that it be indifferently inclined to many; and whether the motion of atoms doth tend to ſome centre; and whether it be continuant or interrupted, and, laſtly, whether it be perpendicular or horizontal, parallel or declined, right, or parabolical, or circular.

In order to ſolve this difficulty, I ſuppoſe that atoms may be conſidered in a double ſtate: the firſt ſtate is before the compoſition of the bodies which are made of them, and may be called the ſtate of liberty; the other is that which they have in the bodies which conſiſt of them, which may be termed the ſtate of obligation or ſervitude.

If atoms be conſidered in their firſt ſtate, their motion is perpetual; ſo that an atom that is looſe, and freed from any compoſition, is eſſentially in motion, which ought not in the leaſt to be wondered at; for motion in reſpect of a free atom is the ſame that underſtanding is in reſpect of an angel, which is never without knowing, unleſs his intellect be bound and clouded.

From this principle it is evident, that atoms are in continual motion, unleſs they are hindered, or that they meet with ſome obſtruction, or that there are other atoms reſiſting or repelling them, or that they find ſuch as will ſtick to them, or that they inſinuate themſelves into the atoms of certain bodies, or that they enter into ſome compoſition whereby their motion is ſtopped. Nevertheleſs, atoms in compounds are not altogether void of motion, becauſe they are not ſo ſtraitly embodied together but that they have ſome motion, like vibrations and palpitations, according to the liberty which is granted them by the diſſeminated vacuities; nay, ſome of them do ſometimes attempt their eſcape, eſpecially in porous bodies, which therefore ſooner corrupt and periſh than bodies which are more ſolid and cloſe. It is yet more evident in living bodies, out of which the animal ſpirits, which are but the bodies of atoms, and moſt ſubtle corpuſcles, are diſſipated by tranſpiration, whence aliment is neceſſarily requiſite to ſupply to the whole body thoſe ſpirits which are diſſipated by motion and agitation. This motion of atoms, or the leaſt corpuſcles, in living bodies, may be deſervedly accounted the image of their firſt liberty; and, though they do but ſeldom enjoy their full liberty, yet they are apt to raiſe the greateſt commotions in order to be freed, and to gain their liberty. This is the origin of many diſtempers; as, in acute fevers, the atoms or corpuſcles of the boiling blood, or obſtructed choler, are carried and driven into the brain, where they produce watchfulneſs, deliriums, and phrenſies. According to this principle, that which we ſaid before may be concluded, *That many diſtempers ariſe from minute corpuſcles and emancipated atoms;* for theſe, being driven forwards by other atoms, and forced back, run into the membranes, perioſtium, meninges, or inteſtines, and cauſe the cholic, head-ach, gout, and rheumatiſm; ſo that this ſolution of corpuſcles and emancipation of atoms in our bodies is much to be dreaded; and, to prevent their danger, all motions of the body which are too violent muſt be avoided; for theſe are the external cauſe of the confuſion of the ſpirits and the emancipation of the atoms.

The emancipation of the atoms, and alſo of the ſmall corpuſcles which are compoſed of thoſe atoms, are to be ſeen no leſs in the great world than in the little: for the winds are nothing leſs than emancipated atoms, which, by their impetuoſity being driven backwards and forwards, force all bodies that ſtand in their way:

it is theſe atoms which agitate the air, and overturn all things which reſiſt their motion; therefore the motion of atoms is not equal, nor every where alike, but varies according to the diverſity of bodies whereby they are driven, or as the figures of them are more or leſs fitted for motion, or otherwiſe, according to the proportion of vacuities which are diſperſed in bodies; ſo that ſome atoms are moved quicker, and others ſlower, not becauſe ſome are heavier than others, but becauſe they are driven backwards or forwards, or are ſtopped, by others which happen to fix them with greater or leſs violence.

An atom is not a body according to the notion we have, that it is a compound being; but a ſimple being, and alſo corporeal; that is, ſimple, becauſe it is indiviſible; and corporeal, becauſe it hath a certain extenſion, and makes up the compoſition of bodies, which in the total diviſion of them are reduced again into atoms. Two other difficulties ariſe from the former opinion: for, if an atom be indiviſible, after what manner can we propoſe to ourſelves that it hath extenſion, or how can it be an ingredient in the compoſition of diviſible bodies? To this we anſwer in few words, that extenſion is according to the nature of the thing extended; for, if the thing extended be diviſible, in the ſame manner is the extenſion; and ſo, on the other ſide, it is of the rational ſoul, which is poſſeſſed of the whole body, and exerciſes its operations in all the parts of it; nevertheleſs it is, like an atom, indiviſible; and, though it be diviſible in reſpect of the ſpace it occupies, yet it hath an internal extenſion which is indiviſible; it is the ſame thing which divines are forced to ſay of angels, and ſome philoſophers about their phyſical tumid points. But ſome will ſay, that atoms are neither like ſouls, angels, nor phyſical points, becauſe they have parts, and theſe have none; and ſince that which conſiſts of parts is diviſible, it follows alſo that an atom is diviſible. To this difficulty I anſwer, with the divines, that angels and our ſouls, which are ſpirits—and alſo, with philoſophers, that phyſical points, which are material—have no real but only potential parts; that is, an angel and rational ſoul in reſpect of the operations which they exerciſe and the ſpace which they occupy, and the tumid points in reſpect of the ſpace which they fill up. Indeed, an angel and the ſoul have two powers, whereof the one is the intellect, the other the will, which, being only an indiviſible ſubſtance, capable of underſtanding and willing, yet no man will deny but they, notwithſtanding their indiviſibility, (which at leaſt is equal to the indiviſibility of an atom,) do fill up a diviſible ſpace; as no man can doubt but that an angel can be at the ſame time in the four corners of the room and in the middle of it, and that it hath a four-ſquare figure by communication of the four angles or corners, and that it can quit this and aſſume another figure at its pleaſure; which cannot be ſaid of tumid points and atoms, which are

deſtitute of underſtanding and will. The rational ſoul, being equally indiviſible with an atom, angel, or point, doth wholly poſſeſs a great body, no leſs than it did when the body was little; therefore it dilates itſelf without being divided, becauſe in its nature it is ſimple and indiviſible, and is without diſtinct parts. This is the opinion of Ariſtotle, and indeed it is the moſt common opinion. But, if the ſoul were not by its own ſubſtance extended through the whole body, and had its ſeat only in the heart, as Empedocles would have it; or in the ſpleen and the ſtomach, as Van Helmont places it; or in the *glandula pinealis* of the brain, according to Carteſius; or in the ſtriate bodies of the brain where the common ſenſe is, or the ſenſe itſelf, as it is called by way of excellency; and in the callous parts, becauſe there it forms the ideas of things and judges of them; and in the cineritious part of the brain, becauſe there it performs the functions of the memory, according to the opinion of Duncan—it is certain that all theſe parts, which are taken to be the ſeat of the ſoul, are diviſible, and that thay have diſtinct parts and figures: ſo the ſoul, as it is indiviſible, occupies a ſpace or place which is diviſible; whence I conclude, that indiviſibility does not hinder but that a ſubſtance may have a certain indiviſible extenſion, but diviſible as to the place which it poſſeſſes, or that it may have angles and figure in reſpect of place, though its ſubſtance eſſentially remain one, ſimple, and indiviſible.

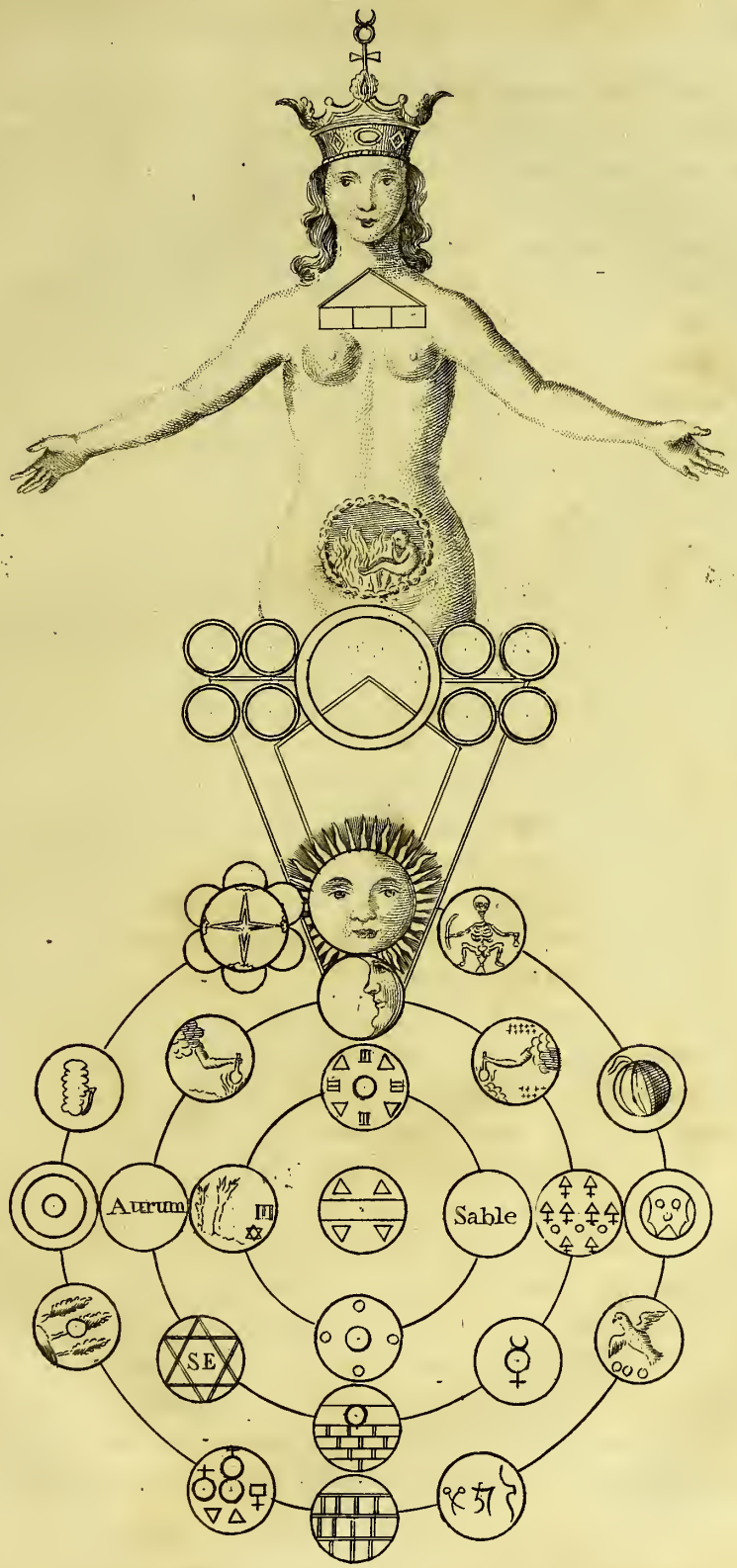
Hence it follows that there is one catholic or univerſal matter, called corpuſcles or atoms, filling all ſpace, which is an extended, impenetrable, and diviſible, ſubſtance, common to all bodies, and capable of all forms; infinitely harder than any of the ſenſible porous bodies compounded of them; even ſo hard, as never to wear, or break in pieces; no other power being able to divide what God made one in the firſt creation. While theſe corpuſcles remain entire, they may compoſe bodies of one and the ſame nature and texture in all ages; but, ſhould they wear away or break in pieces, the nature of things depending on them would be changed. Water and earth, compoſed of old worn particles and fragments of particles, would not be of the ſame nature and texture now with water and earth compoſed of entire particles at the beginning; and therefore, that nature may be laſting, the changes of corporeal things are only to be placed in the various ſeparations and new aſſociations of theſe permanent corpuſcles; that, in order to form the vaſt variety of natural bodies, this matter muſt have motion in all its aſſignable parts, and act in all manner of directions and tendencies. Theſe corpuſcles have therefore not only a *vis inertiæ*, accompanied with ſuch paſſive laws of motion as naturally reſult from that force; but alſo are moved by certain active principles, ſuch as that of gravity, and that which cauſes fermentation, and the coheſion and ſympathy of bodies. That this

this matter muſt alſo be actually divided into parts, and each of theſe primitive particles, fragments, or atoms of matter, muſt have their proper magnitude, figure, and ſhape; and muſt have different orders, poſitions, ſituations, and poſtures, whence all the varieties of compound bodies ariſe. This view of the firſt principles of matter accounts for an infinity of phenomena, otherwiſe inexplicable; and points out all the occult operations in nature, by ſympathy, antipathy, faſcination, coheſion, coagulation, diſſolution, &c. for, ſince theſe corpuſcles are every-where and at all times in motion, iſſuing from and cohering to all bodies that fall in their way; and ſince they are operated upon and diverſly altered by the four elements proper to this world; and theſe elements again by rays of light, heat, and influx of the anima mundi, and celeſtial bodies—all the viciſſitudes of nature are deduced from them; and, according to the qualities and temperature of the matter ſo formed, and of thoſe they come in contact with, are the affections of the mind, the functions of the body, the paſſion of love, and a thouſand inexplicable circumſtances attendant on human affairs, regulated and governed; as we ſhall now proceed to ſhow.

Of SYMPATHY and ANTIPATHY in NATURAL BODIES.

THE wonderful effects we ſee in nature, whoſe true and efficient cauſes are not eaſily found out, obliged philoſophers heretofore to have recourſe to occult cauſes, and to attribute all thoſe effects to natural ſympathy and antipathy, which happen amongſt the ſeveral bodies whereof the world is compounded.

That we may the better underſtand what may be ſaid upon a ſubject ſo nice and delicate, and give a reaſon for thoſe wonderful effects which are attributed to ſympathy and antipathy, in the firſt place we muſt ſuppoſe, that the difficulty which occurs in explaining an effect of this nature, is becauſe the mind is not able to know the truth of things but by the ſenſes, which are the gates through which the objects enter, and form their ideas in our underſtanding; but, becauſe there are an abundance of things that eſcape our ſenſes, it is no wonder that it is ſo hard to give a reaſon for thoſe cauſes which are ſo remote from our view: as for example, iron moves itſelf, and that by way of local motion, and joins itſelf to the loadſtone; we do not ſee that which draws the iron to it, though we ſee it attracted; and therefore, that we may give a ſolid reaſon for this and other phenomena of the like nature, we declare, according to our philoſophy, that there are no bodies but what continually emit certain ſubtle particles and imperceptible corpuſcles which are diſperſed through the air, and are ſometimes carried to a great diſtance, unleſs they are ſurrounded by other bodies in their way. By this principle we find the reaſon why a dog follows the



Dodd delin.t

Symbol of the Universal Spirit of Nature.

Prattent sculp.t

the footſtep of the hare, or from a heap of a thouſand ſtones, he readily knows the ſtone his maſter threw, and picks it out, and by his command brings it to him; from this diſperſion of corpuſcles, we find the reaſon how the contagion of the plague, either from the perſon infected, or from the wind blowing from that region, is carried a great way off; and hence appears the reaſon why wounds may be cured at a hundred miles diſtance by means of the ſympathetic powder, the aſtoniſhing properties of which are fully deſcribed in my Illuſtration of the Occult Sciences; ſo likewiſe of the fermentation of Canary wine brought into England, which ferments here at the very time of the vintage there.

We muſt ſuppose, farther, that theſe ſmall corpuſcles differ in figure and magnitude, and are not equally received by this or that body; ſo one man is infected by the plague in the ſame place where many others eſcape; for the ſame reaſon the beams of the ſun melt wax, but not lead unleſs they are collected and united by the help of a burning lens, or the like; and the heat of fire melts metals in a very different manner.

Again, the palm-tree of the male kind is barren unleſs the female be planted near it; and, if ſeparated by a river, they lean to each other as if they would embrace. If you ſtrike the ſtring of a lute in one corner of a room, it ſhall cauſe the ſtring of another lute, tuned to the ſame pitch, and placed in an oppoſite corner, to give a ſound; the cock always crows and claps his wings at the moment the ſun aſcends the horizon. All effects which we ſee from ſympathy afford us matter of admiration; but the loadſtone demonſtrates the affinity of corpuſcles more palpably to our ſenſes than moſt other experiments. The loadſtone is found in iron-mines, and is not much different from the nature of iron; wherefore the particles which proceed from the loadſtone have a kind of agreement with the pores of iron; and theſe ſmall corpuſcles, going out of the loadſtone, and meeting with the iron in their way, ruſh into the pores of it; but, becauſe all cannot enter at once, a great many remain without, and theſe are as ſtrongly beaten back by the particles of the iron which they meet with as if they were of the number of thoſe corpuſcles, which, being at liberty, return of their own accord, and at length ſend theſe by a reflective motion to the loadſtone, from whence they firſt came. Hence it is that the iron is drawn towards the loadſtone, principally by the agitation of thoſe minute magnetic corpuſcles moved in the concavities of the iron; and, being ſhaken together by the ſundry motion of thoſe corpuſcles which are twiſted one within another, thoſe corpuſcles which return by reflection are complicated and annexed to thoſe which are in the pores of the iron, and cannot be returned or moved towards the loadſtone, unleſs they draw along with them thoſe corpuſcles to which they are annexed, and which cannot fol-

low unleſs by their motion the iron be carried with them; ſo the iron follows and is moved toward the loadſtone, except the iron be bigger than the loadſtone; for then the corpuſcles which proceed from the loadſtone are not ſo many, nor by conſequence ſo powerful, as to draw the iron. The reaſon the loadſtone draws no other body but iron, is becauſe other bodies do not return the atoms, neither are their pores well fitted for thoſe magnetic corpuſcles. By the ſame reaſon it appears, that the loadſtone does not approach to the iron, but the iron to the loadſtone. It may be ſaid that hard and ſolid bodies, ſuch as iron, cannot emit ſuch a great number of corpuſcles as other bodies, which, like the loadſtone, are leſs ſolid and more porous. There may be a reaſon given alſo why the loadſtone, being rubbed with garlic or oil, does not ſo eaſily draw iron to it; which is, that theſe ſtrange corpuſcles, by their oilineſs, hinder the emiſſion of the corpuſcles out of the loadſtone, and alſo their entrance into the pores of the iron, and thus break their elaſtic force.

We may obſerve many other effects of the loadſtone: as for example, that iron put upon a table is moved by the virtue of this ſtone placed under the table; for it is certain that the corpuſcles of the loadſtone which moves the iron penetrate through the vacuity or pores of the table, as if by ſmall and inviſible threads it had been tied to the loadſtone. It is the ſame thing if the table be of marble or glaſs, provided it be not greaſy nor too thick; which proves the poroſity of bodies in general. Another effect of the loadſtone is ſeen in a needle, which, being touched by it, always turns towards the north pole; the reaſon is, becauſe there are mountains of loadſtones under the poles, diſperſing their attractive ſpirits through the univerſe, ſpirits which are entangled with thoſe which adhere to the magnetical needle, whoſe force is leſſened as the ſpirits of it are diſſipated; eſpecially if the compaſs be ſet in a place where there are pieces of iron to which the ſpirits ſtick, and leave the needle, which had taken no greater quantity of them than what was requiſite according to its capacity. But the moſt wonderful property in this ſtone is, that it draws iron on one ſide, and rejects it on the other; ſo that it appears in every loadſtone that there are two poles of the world, the north pole attracts iron, the ſouth pole repels it; becauſe the ſpirit of the north pole enters in at the pores of the iron, but the ſouthern cannot, for it ſtrikes againſt the iron, and drives back too much its elaſtic particles. This explication preſuppoſes the being of ſpirits and atoms, and their figures and motions, as alſo ſmall occult vacuities, which are diſperſed through all bodies.

There are obſerved to be many effects for which no reaſon can be given, without the help of the word *antipathy*. We will inſtance ſome few: and, firſt, of the baſiliſk, who kills all whom he ſees, which is by the antipathy ſubſiſting betwixt it and other animals; but this is rather done by the emiſſion of certain venomous ſpirits, which

which penetrate the eyes of thoſe ſeen by the baſiliſk; the nature of this poiſon cannot be explained, unleſs we know the occult property of poiſon, becauſe poiſon kills only by a contrariety betwixt us and it; whence we diſcover the principle of this contrariety of the baſiliſk, that the ſpirits iſſuing out of the pores of its eyes kill thoſe animals which they meet with, becauſe the ſpirits penetrate them by their ſubtilty, or ſharp figure, like needles piercing the heart. The poiſon of vipers, and ſuch like, is not ſo acute nor ſo deadly, nor ſo ready in its effects, as that of the baſiliſk. In reference to this matter, there are many things that are worth conſidering. In the firſt place, it is certain that the baſiliſk is not engendered but in moiſt deep places, as in the bottom of pits where there is nothing but muddy, thick, ſtinking, water. In the ſecond place, it is to be obſerved, that if you take a glaſs, and hold it againſt the baſiliſk's eyes, thoſe ſpirits which iſſue from his eyes reflecting upon the glaſs are ſent back from whence they came, and will kill the baſiliſk. Now it cannot be ſaid that the baſiliſk hates itſelf; but that the venomous ſpirits, reflecting from the glaſs, receive a more violent motion, and forcibly drive back the other ſpirits which are iſſuing from his eyes, ſo that they penetrate his brain and heart, and thence occaſion his death; in the ſame manner as vapours often ariſe with ſo great violence from the hypochondria, the meſentery, and the ſtomach, into the head, that they cauſe an apoplexy, epileptic dizzineſs, or lethargy; and ſometimes they are carried with ſuch ſubtilty and violence into the heart, that the perſons ſo afflicted die ſuddenly.

A ſtrange antipathy ſubſiſts in ſome vegetables, as between the colewort and the vine, which, if planted near together, will inſenſibly give back and lean ſideways, as if they really hated one another. This effect cannot be aſcribed to any thing but the emiſſion of the corpuſcles and material ſpirits of both of them, which ruſh upon one another, and mutually repel, by the irregularity of their figures. This is apparent in the juice of coleworts, which if taken by a man when he is drunk, he preſently comes to himſelf and is ſober; becauſe the corpuſcles of the juice of coleworts blunt the corpuſcles of the juice of the vine. In the ſame manner, we find by experience, that ſpirit of opium or laudanum cures the cholic, head-ach, tooth-ach, and other kinds of pains; it alſo cures the phrenſy, and procures ſleep. But there is need of the greateſt care in uſing theſe narcotic medicines, becauſe it often happens that the vital ſpirits are ſo ſtupified by them, that they are deprived of their motion, which cauſes a deadly ſleep. The colewort and the vine have not ſo powerful an effect on each other as narcotic medicines have on the animal ſpirits; for neither the vine nor the colewort will lean ſideways if there be cloth or paper ſet betwixt them, becauſe the corpuſcles flowing from each are then ſtopped in their way.

A third

A third effect, which is aſcribed to antipathy, is obſerved in the uſe of medicines, as well internal as external; the external, of which we now ſpeak, are thoſe we carry about us, which by their quality take away the malign air, and preſerve us from the plague and other contagions; as prepared quickſilver, or a toad dried and ſhut up in a box. This phenomenon is aſcribed to the peſtiferous ſpirits or corpuſcles, which, approaching towards us, find ſubjects more apt for their reception, and fix in them, but not in us, at leaſt in ſuch a quantity as to hurt us; which moſt evidently appears in this, that the prepared quickſilver, or the toad, being once filled with theſe contagious atoms, becomes uſeleſs, and ought to be changed and renewed; and I know by experience that quickſilver, prepared white and ſhining like an adamant, or poliſhed ſilver, being carried about a perſon who is frequently with ſick people, in time becomes black, ſo that afterwards it is uſeleſs to him who carries it, becauſe there are no ſmall vacuities left to retain the airy poiſons; but it may be renewed by another preparation, whereby it may be made as white, tranſparent, and uſeful, as before. Quickſilver turns black, more or leſs, ſooner or later, according to the proportion of the greater or leſs malignity in the air where the perſon goes who carries it about him. And theſe antidotes can never hurt; nay, if rightly prepared, they not only withſtand the contagious air, when they hinder its nearer approach towards us, but alſo ſuppreſs inward vapours, which, aſcending into the head, occaſion many diſtempers. Theſe conſequences, properly ſpeaking, are the joint effects of ſympathy and antipathy acting together; for the animal effluvia or corpuſcles iſſuing from our bodies repel as much as poſſible the malignity of the ambient matter, by antipathy; whilſt bodies compoſed of poiſonous or noxious particles, draw to themſelves, by ſympathy, the foul or poiſonous atoms which ſurround them, juſt the ſame as the loadſtone draws iron. In this we ſee, and ſhall hereafter prove, that amulets or charms, worn about the body; that electricity, animal magnetiſm, and other occult properties, acting upon our bodies; though attributed to witchcraft, or ſome inexplicable cauſe, are nothing more than the natural effects of ſympathy and antipathy, pre-ordained at the beginning of all things. Aromatic herbs and ſweet-ſmelling flowers, uſed againſt infectious air, act by repulſion, or antipathy; whereas nightſhade, hemlock, and all poiſonous herbs, act by ſympathy, drawing into their pores the infectious atoms, juſt the ſame as horſe-radiſh draws in vinegar; and hence it follows that both theſe claſſes of plants are uſeful in preſerving the animal juices from infection.

I now proceed to effects internal. Rhubarb, and the leaves of ſenna, purge melancholy; jalap and diagridium, phlegm and watery humours. It is a conſtant and certain truth, that every purgative medicine comprehends in it certain ſpirits

or

or corpuſcles which are venomous, that is, acute, pungent, and biting; ſo that, nature being ſtirred up by them, and thereby the internal parts and membranes being touched and agitated, the animal ſpirits ruſh together in order to aſſiſt the part affected, and draw with them the foreign humours which are less fixed; and then nature, by the help of theſe ſpirits, expels them by the proper paſſages: ſo that, after a purgation by rhubarb, the urine is yellow, but, after ſenna or caſſia, it is dark and high-coloured.

Thus ſympathy and antipathy exiſt in all ſubſtances, whether animal, vegetable, or mineral; and things of one claſs have affinity or correſpondence with things of another claſs, or contrariwiſe, according to the nature and quality of the atoms or corpuſcles whereof they are formed. Hence it is that ſo ſtrong a ſympathy exiſts between rue and the fig-tree; and that the elm rejoiceth to cohabit with the vine: and hence it is likewiſe that ſerpents preſerve their ſight by fennel; and that the hind draws out the piercing dart with dittany, or garden-ginger. Hence also, by antipathy, water and oil, and wine and the juice of hemlock, repel each other; as do the vine and braſſic plants; for the vine, which uſually entwines round every thing it is near, ſhuns and inclines another way from theſe. Rue, and the aſh-tree, are ſo inimical to ſerpents, that they cannot exiſt under their branches; and the herb polypody is ſo obnoxious to crabs, that, if they are covered over with its leaves, they will in a ſhort time caſt off their ſhell and claws.

From an inveſtigation of theſe properties in nature, medicine and the art of healing were firſt diſcovered. All things temperate in quality concord ſympathetically with our bodies; as ſweet marjoram and nutmeg to the head, and wormwood to the belly. Those which exceed this medium in their temperaments are noxious and hurtful; and are the more dangerous or deadly, in proportion as they recede from the temperate quality, which we perceive in opium, arſenic, and the like. From this cauſe, we likewiſe find that ſympathy and ſimilitude are ſynonymous; and that all ſubſtances which have reſemblance by ſignature, have ſympathy and agreement by nature, and ſerve for the conſervation of each other. Thus ſulphur is found to preſerve wine, which hath great analogy with our blood; and, if wood, or cables, or any thing whoſe uſe is in the water, be done over with a preparation of the oil of ſulphur, they will be preſerved, in a moſt ſingular and remarkable manner, from injury or decay. From hence Paracelſus concludes, that the particles of ſulphur are of themſelves a balſam, ſufficient to prevent wine or any inanimate ſubſtance from putrefaction; and ſo conſerves the body, that no adverſe qualities can prejudice or affect it. Querintius, in his Pharmacy, aſſures us, that ſulphur rightly prepared is the true balſam of the lungs, and the principal ingredient uſed by the

ancient Egyptians to embalm their mummies, or bodies of their deceaſed nobles, whereby they are preſerved even to this day from putrefaction, as may be ſeen in the Britiſh Muſeum, and in moſt other magazines of curioſities. Sulphur is certainly the efficient cauſe of all mineral ſprings; of all cryſtallizations, ſtones, pebbles, &c. by which they concrete, and are held together, as is evident from ſtriking them againſt ſteel, the ſparks of fire produced being the ſulphurous or inflammable part. All volcanos, burning mountains, and ſubterraneous fires, are occaſioned by ſulphur; as are likewiſe earthquakes, thunder and lightning, meteors, &c. The active properties of ſulphur are indeed wonderful; and, were I to inſtance many that I have diſcovered in the various chemical preparations I have made of it, few of my readers would be diſpoſed to give me credit. For ten ſucceſſive years I applied myſelf to the daily toil of making chemical experiments; and there is ſcarcely an herb or a mineral ſubſtance to be found, that I have not paſſed through the retort, or the crucible, in order to aſcertain their native qualities, and power of action, previous to the invention of my Solar and Lunar Tinctures; and I muſt confeſs that the occult properties of ſulphur coſt me more labour to fix, to inveſtigate, and to aſcertain, than all things elſe together, except mercury. And I do in conſequence affirm, that there are no mineral ſubſtances in the bowels of the earth, whoſe virtues are not communicated to plants and herbs growing on the earth's ſurface; and that the correſpondent virtues found in theſe herbs are infinitely more pure, innocent, balſamic, nutritive, and better adapted to medicine, than any groſs or earthy particles whatever. Even from the common herb borage, we can extract nitre, ſea-ſalt, tartarum vitriolatum, and the common fixed alkali; and it is no trivial information to the medical world, to know, that the three mineral acids are all to be found in one humble plant. Indeed vegetables appear to be the medium contrived by an all-wiſe and omnipotent Creator, for ſelecting, concocting, and combining, the medical and occult virtues of the different ſubſtances found in the bowels of the earth, and for adapting their virtues, by an eaſy and natural concoction, to the alleviation of human infirmities; according to that paſſage in ſcripture which ſays, that *the Lord hath cauſed medicines to grow out of the earth, and he that is wiſe will not abhor them, for with ſuch doth he heal men, and taketh away their pains.* Eccl. xxxviii. 4, 7. Whence I conclude, that all diſorders incident to mankind are to be cured, preferably and more elegantly, more ſafely and certainly, by preparations from medical plants and herbs, than from any mineral ſubſtances whatever; and that mercury, for the *lues venerea*, for the ſcrophula, and impurities of the blood, ought to be wholly expunged from our practice. Its baneful effects are every day more or leſs experienced, in the rotten bones and ruined conſtitutions of thoſe who have habitually

habitually taken it in advertiſed noſtrums for "a certain complaint," until it has fixed itſelf, and the diſeaſe likewiſe, ſo ſtrongly in the habit, as to be almoſt beyond the reach of a proper remedy, which in reality and truth can only be found in the vegetable world.

Vegetables bear relation to the ſeven planets, and have form and affinity with the microcoſm, or parts of man; and conſtitute the original aliment intended by the Creator for the ſuſtenance of our bodies. And whatever ſignature or ſimilitude a plant has with any member or part of our body, it will promote a cure in that part, and tend ſympathetically to its comfort and preſervation. For example, thoſe herbs which in any reſpect reſemble the form of the eyes, are ſalubrious and healing to the eyes; as eyebright, ſcabious, marigold, chamelion, ſempervivum, nardum, and ſtar-wort. So plants which reſemble the head are cephalic, and help the diſorders and infirmities thereof; the walnut reſembles the brain, ſo that, if the oil or ſpirit of the nut be applied to the head, it ſtrengthens the fibres and comforts the brain. Maindenhair and the moſs of quinces have the figure of the hair of our head; and a decoction of theſe herbs, in reſtoring hair loſt by the *lues venerea*, is wonderfully efficacious. So plants, which in root, leaves, or fruit, reſemble the figure of the heart, have a power of comforting and ſuſtaining the heart: as the citron-apple, fuller's thiſtle, ſpikenard, mint, balm, white-beet, trefoil, and mother-wort. Herbs which reſemble the lungs promote reſpiration, and ſtrengthen the lungs; as hounds-tongue, lung-wort, ſage, camphor, wall-wort, &c. Plants which reſemble the ears conduce much to the relief of all diſorders of the ears; as fools-foot, or wild ſpikenard, which are a ſpecific for deafneſs; and ſo an oil extracted from the ſhell of ſea-ſnails, which reſembles the ear, has been found of wonderful efficacy in reſtoring the faculty of hearing, even after ſeveral years deafneſs. The ſenſe of ſmelling is greatly promoted by the application of thoſe herbs which reſemble the noſe, as water-mint, &c. So plants that bear reſemblance with the womb, conduce much to ſtrengthen and comfort the ſame, to purge the uterus, and promote fecundity; as the round birth-wort, briony, ladies-ſeal, heart-wort, ſatyrium, and mandrakes, which have round and hollow roots. Plants which bear ſimilitude with the gall and bladder contribute to the benefit of thoſe parts, by breaking the ſtone, ſtrengthening the urinary paſſages, and bringing away the gravel; as particularly pointed out in my edition of Culpeper's Herbal. So likewiſe herbs and roots which bear affinity with the generative parts contribute much to their virility, ſtrength, and vigour; and truffles, potatoes, and the capſules of the caſhew-tree, which have ſimilitude with the teſticles, wonderfully ſtir up and promote the ſemen; as do the parſnip, the root of rag-wort, and the *mangel wurzel*, or root of

ſcarcity,

ſcarcity, contribute much to ſtimulate the virile member. Herbs having formation like the milt, nouriſh and preſerve the ſame, ſuch as ſpleen-wort, milt-wort, lupines, and ivy. Plants which in leaves or roots bear ſignature with the liver, do wonderfully concur to promote a good digeſtion and concoction of the blood, to prevent the liver from decay, and to heal and cure all infirmities thereof: ſuch virtue has the herb trinity, agaric, liver-wort, fumitory, lent-figs, &c. Herbs and ſeeds reſembling the teeth confer much to the good and preſervation of them; as tooth-wort, the pine-kernel, and the ſeeds of hemlock. Thoſe plants which have reſemblance with the knuckles and joints of the body, are wonderfully efficacious againſt the gout, white ſwellings, and all pains whatever in the joints; ſuch as galingal and knotty odoriferous ruſhes, &c. Plants and herbs expreſſing a natural fatneſs or oilineſs increaſe corpulency, or fatneſs of the body; as all pulſe, almonds, and kernels of every kind; and, by the ſame rule, thoſe vegetables which have a lean and ſpare deſignation, macerate and reduce the body, ſuch as ſarſaparilla, long-leafed roſa-ſolis, &c. Nervous or ſtringy plants ſupple and fortify the nerves and ſinews; as fennel, flax, hemp, the nettle, the herb neuras, and the root of mallows. Vegetables poſſeſſing a milky juice propagate milk in all female animals; and thoſe poſſeſſing a ſerous quality purge the noxious humours between the fleſh and ſkin, as ſperage, ſcammony, and the like. Plants that are hollow, as the ſtalks of corn, reeds, leeks, mallows, hollyocks, garlic, and bugloſs, are ſingularly good to purge, open, and comfort, the porous and hollow organs of the body. St. John's wort, having its leaves perforated, is ſanative to wounds; and palma Chriſti, having in its root a ſtrong reſemblance of the hands and fingers, is remarkably healing to all cuts, burns, ſcalds, and injuries, thereof.

There is another ſimilitude found between ſome vegetables and the brute ſpecies, which directs us to a very curious occult virtue, in curing hurts or injuries received from thoſe creatures they bear affinity with. Thus, the herb dragon, which in form reſembles a ſnake, and the bramble called Chriſt's-thorn, having its thorns ſet like the teeth of ſerpents, are an abſolute cure for the bite of thoſe animals. Ragwort, which is like a bee, is the beſt cure for the ſting of bees. Fleabane, which grows as if covered with vermin, cauſeth all fleas to avoid the room. Scorpion-graſs, dart-wort, and the flowers of turnſol, having ſimilitude with the tail of a ſcorpion, have ſurpriſing efficacy in curing hurts by all venomous creatures.

The properties and virtues of plants are alſo known by the analogy of their form; thoſe of the ſame or like figure having the ſame or like virtues and uſes. Thus the umbelliferous tribe have all a carminative taſte, or ſmell, and are conſequently powerful expellers of wind, and good in all flatulent diſorders. The galeate or verticil-

late

late kind are all of them a degree warmer, and more potent, and therefore may be reputed aromatic, and proper for nervous diſorders. The tetrapetalous kind are hot and biting, and exert their power by means of a diuretic volatile ſalt with which they abound; and are therefore good in chronical diſeaſes, obſtructions, cacochymias, &c.

The colours of plants and herbs likewiſe bear ſimilitude or ſympathy, and direct us to a knowledge of their temperature and uſe; thoſe of a light colour, ſuch as briony and water-lily, are profitable for the cure of phlegmatic diſeaſes. Thoſe of a yellow aſpect purge choler, and remove obſtructions occaſioned thereby; as is the effect of rhubarb, celandine, &c. Thoſe of a ſanguine hue purify the blood and juices, and contribute greatly to a good complexion; as the root of fernbrake, agrimony, germander, and ſorrel. And this rule is to be obſerved with reſpect to plants in general; that ſo many diſtinct colours as it hath commixed, ſo many virtues will it poſſeſs; and whatever diſeaſe it bears analogy or ſympathy with, that diſeaſe it will cure. The flower of the water-lily, bearing the ſignature of a drop of water, is a preſervative againſt the apoplexy. The root of ſaſſafras, and the ſtones of cherries, are good againſt the ſtone and gravel in the bladder and kidneys. The ſeeds of marigolds have reſemblance with the canker, and are a certain cure for that complaint. All plants of a glutinous nature, having their ſtalks ſignated with cuts and ſtabs, are ſanative to cuts, ſcars, and wounds. The root of galangale growing in marſhy grounds, and taken up in May or June, and worn as an amulet againſt the belly, will perform moſt aſtoniſhing cures in the dyſentery and flux; it has a ſtrong reſemblance to the natural excrements, both in figure and colour. All the excreſcences of trees ariſing above the branches, are good againſt excreſcences of the arteries. The ſtrawberry very much reſembles the puſtules of the leproſy; and the diſtilled water of ſtrawberries is a moſt admirable cure for that complaint, as well as for red and pimpled faces.

We may further remark, that the more ſignatures or ſimilitudes are found cohering in a plant to one and the ſame ſignification, ſo much the more powerful and efficacious will its operation be, in any of the purpoſes for which it is applied; for the ſpirit is in quality the ſame in all bodies, but different in quantity, which conſtitutes that variety or difference perceivable by our ſenſes. In ſome bodies this ſpirit is more copious and active; in others, more ſparing and debilitated; ſo that, by how much the more the ſame ſpirit produces a convenient form and figure in divers things or ſubjects under the ſame climate, by ſo much the more the ſame ſubjects are enabled to ſympathize with, and aſſiſt, each other. For ſympathy is by the ſpirit; and ſimilitude points out the things that act by ſympathy. Hence it

is that ſimilitude of affection increaſes ſtrength, and the contrary, hatred. So it is that plants whoſe parts reſemble the ſcorpion, as libards-bane, hellebore, and aconitum, will cure the bite of that reptile; and that the flowers of plants, having the reſemblance of butterflies, conduce to fruitfulneſs and virility, as gandergooſe, the flower of beans, woodbine, and ragwort. Plants ſpotted like ſerpents, as cow-garlic, wake-robin, dragon-wort, ſea-dragon, &c. are ſanative again ſtthe bite of ſerpents; and plants which reſemble the head of ſuch animals are alſo good againſt their poiſon; as the flowers of wild bugloſs, which reſemble the head of a viper, Dioſcorides affirms to be a certain cure.

The virtues of plants and herbs are, however, variable, and liable to be injured by change of climate, which will alter or deſtroy them, as we ſee in many of the medical plants of other countries brought into England; which, though they ſeem to flouriſh with us, never poſſeſs their virtues in the ſame excellent degree as in their own climate, which is the reaſon that CULPEPER *recommends Engliſh herbs for an Engliſh conſtitution.* The bodies of different animals alſo render the effect of the ſame plant different; thus the tythmels, or ſpurges, are all very violent cathartics when taken by us; but they are eaten by goats and ſeveral other animals, without any purgative effect, and ſeem to give them a particular ſhare of vigour and ſpirits. Fiſhes, on the contrary, are more ſtrongly affected by them than we are; for the juice of ſpurge, made into a paſte with flour and honey, will ſo much intoxicate them, that they may be taken out of the water with one's hand. Again, bitter almonds are of no ill-conſequence to us, while they kill all ſorts of birds that touch them. The Buceros, or hornbill, feeds upon the *nux vomica*, which is known to be a moſt deadly poiſon to man and all quadrupeds and fiſhes. This is a late diſcovery. See my Syſtem of Nat. Hiſt. vol. viii. p. 153. and ENCYCLOPŒDIA LONDINENSIS, vol. iii. p. 478.

The foregoing notions may be ridiculed, from their extreme ſimplicity; yet where is the man, at all converſant with natural philoſophy and phyſic, and poſſeſſed of an impartial mind, that will dare to controvert theſe facts? Every wayfaring man knows ſomething of the herbs I have mentioned, and is capable of judging of their ſimilitude and ſympathy. Let him apply them for the purpoſes I have pointed out, and their occult properties will ſoon be viſible to his ſenſes. The track of nature is a plain and obvious road, abounding with moſt pleaſing proſpects, and the ſureſt guides. God, in the plenitude of his omniſcience and mercy, ſeems to have ſet a mark on the minuteſt particles of his creation, for man's information and benefit; in the contemplation of which, our happineſs, as well as our health, will invariably be found.

OF

Of the OCCULT PROPERTIES of GENERATION in PLANTS and HERBS.

ALL plants are produced from ſeeds, as all animals are produced from eggs; and the proceſs of nature is very ſimilar in both kinds of generation. The ſmalleſt vegetables have ſeeds, though often not diſcoverable by the naked eye. Miſtletoe is known to be produced from ſeed; and the ſeſſile and flat funguſes, which ſome conſider as morbid excreſcences, are true ſpecies of thoſe agarics which are furniſhed with caps and ſtems, and grow on the ground, whoſe ſeeds, falling on a moiſt tree, produce, as it were, half-caps without ſtems. Beſides, that ſeeds are the eggs of plants appears from hence, that, as every egg produces an offſpring ſimilar to the parent, ſo do alſo the ſeeds of vegetables; and therefore they alſo are eggs. A ſeed reſembles the egg of an hen; as this, as well as the egg, has a ſhell, external membrane or film, a membrane including the yolk, the yolk itſelf, and the ſcar, or point of life. In ſeeds, the white is wanting, becauſe the moiſture of the earth ſupplies its place, and nouriſhes the embryo of the plant. When the flower is going off, the ſeed begins to ſwell, and on the outſide there appears a veſicle, which is the amnion, furniſhed with an umbilical chord, or navel-ſtring, which is introduced through the chorion to the oppoſite ſide of the egg. While with the egg the amnion increaſes, on its top is obſerved another ſmall body, which likewiſe increaſes continually, till it has filled the whole chorion and egg; and the amnion and chorion are turned into the external ſhell or coat of the ſeed. Thus, as the ſame changes are brought about on the ſeed as in the egg, the ſeeds muſt be the eggs of plants. Farther, that plants ſpring from eggs, is plain from the lobes, which, when we ſpeak of cows and ſimilar quadrupeds, are nothing elſe than ſeveral ſecundines, always adhering to the fœtus, drawing their ſupply or fluids from the matrix, which fluids they prepare for the nouriſhment of the tender fœtus. That moſt plants have ſeminal leaves, or lobes, is very well known. Theſe ſeminal leaves once conſtituted the whole ſeed, except the *hilum*, or little heart, in which is the point of life; and theſe lobes prepare the nouriſhment for the very tender plant, until it be able to ſtrike root in the earth; in the ſame manner as the yolk in an egg, becoming the placenta, prepares the nouriſhment, and ſends it by the navel-ſtring to the chick; after which they drop off. Hence it appears, that the ſeminal leaves are the lobes; but, ſince all lobes proceed from the egg or ſeed, we may fairly conclude that plants are produced from eggs. But, as no egg can produce an animal till it be impregnated or fecundated by the male, it will be neceſſary to inveſtigate the ſituation of the genital organs deſtined by nature for this purpoſe in plants.

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It is plain that the genital organs of plants muſt be ſituated where the ſeeds are produced; now the ſeeds are produced where the flower and fruit are; therefore in the flower and fruit are the genital organs of plants. And, as there was never a clear and evident example produced of any plant which wanted flowers and fruit, though they might not be diſtinctly known on account of their exceeding minuteneſs, we may juſtly ſay, that the eſſence of plants conſiſts in their fructification. Moreover, as generation precedes the birth in animals, the flower in plants always precedes the fruit; and, therefore, we are neceſſarily led to aſcribe fecundation to the flower, and the birth or excluſion of the ſeed to the ripe fruit. The flower may, conſequently, be defined to be the genital organs of a plant, ſerving for fecundation, and the fruit to be the genital organs ſerving for the birth or maturation of the ſeed. And, ſince we know that there are many plants, ſome of which want the calyx, others the corolla, others the filaments of a ſtamina, and others the ſtyle; but that all flowers, the moſſes only excepted, are furniſhed with the antheræ, or ſtigmata, or both together; theſe parts muſt conſtitute the eſſence of the flower. If we find a flower with antheræ, but no ſtigmata, we may alſo aſſuredly find another flower, either in the ſame or a different plant of the ſame ſpecies, which has ſtigmata with the antheræ, or without them. The act of fecundation is performed in the flower; and therefore the genital organs of both ſexes muſt be preſent in the flower; not indeed always in one and the ſame flower; but it is ſufficient that thoſe of the male be in one flower, and thoſe of the female in another; and theſe genital organs are the antheræ and ſtigmata. The antheræ, or male organs of generation in flowers, are nothing elſe but the bodies which prepare and contain the male ſperm; therefore theſe antheræ are the teſticles together with the ſeminal veſicles, and their duſt the genuine male ſperm of plants, anſwering to thoſe particles which are called animalcules in the male ſperm of animals. The propoſition may be evinced by the following arguments: the antheræ and the duſt always come before the fruit; and when they ſhed their duſt, which they do before the flower has attained its full vigour, they have performed their office, and then drop and become uſeleſs. Beſides, the antheræ are ſo ſituated in the flower, that their duſt, which is the male ſperm, may reach the piſtil or female organs; for the ſtamina either ſurround the piſtil, as moſt flowers, or, if the piſtil incline to the upper ſide of the flower, the ſtamina do the ſame; or, if the piſtil nods, the ſtamina aſcend.

Farther, the antheræ and ſtigmata are in full vigour at the ſame time, both when they are in the ſame flower, and when they are in ſeparate flowers. Moreover, if we cut aſunder the antheræ before they have ſhed their duſt, their ſtructure will be found altogether as wonderful and curious as that of the ſeed-

veſſels

veſſels themſelves; for, within, they conſiſt of one, two, three or four, cells; and they open either longitudinally or at the baſe, ſeparating into pieces or valves, or from the top, or at the two points or horns. And, if we cut off the antheræ of any plant which bears but one flower, taking care at the ſame time that no other plant of the ſame ſpecies is near it, the fruit proves abortive, or at leaſt produces ſeeds which will not vegetate. Finally, the figure of the fertilizing duſt will clearly convince any one, that this fine powder is not accumulated by chance, or from the dryneſs of the antheræ.

The powder of the antheræ, in point of fecundation, anſwers to the animalcules in the male ſperm; and the ſtigma which receives this duſt is always moiſtiſh, that the duſt may inſtantly adhere or ſtick to it. That the ſtigmata, which are the other eſſential parts of the flower, are the female organs of generation, may be proved by the following conſiderations: The parts of the piſtillum are the germen, the ſtyle, and the ſtigma; the germen, or ſeed-bud, while the plant is in flower, is always imperfect and immature, being only the rudiment of the future fœtus; the ſtyle is no eſſential part, for it is wanting in many ſpecies of plants; but the germen can never bring the fruit to maturity, except it be within the flower along with the ſtigma. Hence it follows, that the ſtigma is that part of the flower which receives the impregnating duſt. This will farther appear, if we conſider that the ſtigma is always ſo ſituated, that the antheræ, or their impregnating duſt, can reach it; moreover, it has always a figure peculiar to itſelf, ſo that in moſt (though not all) plants it is double when the fruit conſiſts of two cells, triple when the ſeed-veſſel has three cells, quadruple when it has four cells, &c. Again, the ſtigmata are always in full vigour at the ſame time with the antheræ: beſides, the ſtigmata in moſt plants, when they have diſcharged their office, drop off in the ſame manner as the antheræ do; which proves, that the ſtigmata contribute nothing to the ripening of the fruit, but ſerve only for the purpoſe of generation. If the ſtigmata be cut off before they have received the impregnating duſt of the antheræ, the plant is caſtrated as to the female organs, and the fruit periſhes. The ſtigma of the flower has, beſides, two other ſingular properties: viz. that it is always diveſted of the cuticle or film, nor has it any bark as the other parts have, and it is always bedewed with a moiſture.

Upon the whole it appears, that the generation of plants is accompliſhed by the antheræ ſhedding their duſt on the ſtigmata. In the generation of animals, we are certain, that the male ſperm muſt come in contact with the female organ, if there be any impregnation. In the vegetable kingdom, the genital duſt is carried by the air to the moiſt ſtigmata, where the particles burſt and diſcharge their exceeding fine or

ſoluble contents, which impregnate the ovary. This will appear if it be conſidered, that, when a plant is in flower, and the duſt of the antheræ flying about, part of this duſt viſibly lights upon and clings to the ſtigma; the ſtamina and piſtillum are generally of the ſame height, that the male duſt may more eaſily come at the ſtigma; and, in thoſe plants where this is not the caſe, a ſingular proceſs of fecundation may be obſerved; thus in the African tree crane's bill, or Geranium inquinans, where the piſtillum is ſhorter than the ſtamina, the flowers before they blow are pendulous, but upon their opening they ſtand upright, that the powder may fall upon the ſtigma; after which they again nod till the fruit is ripe, and then ſtand upright a ſecond time, that their ſeeds may be more eaſily ſcattered about. In ſome of the pinks, the piſtilla, which are longer than the ſtamina, are bent back like rams-horns towards the antheræ.

Again, the ſtamina for the moſt part ſurround the piſtillum, ſo that ſome of the duſt is always blown by the wind on the ſtigma. Moreover, the ſtamina and piſtillum come at the ſame time, not only in one and the ſame flower, but alſo where ſome are male and others female on the ſame plant, very few excepted.

Farther, in almoſt all ſorts of flowers we ſee how they expand or open by the heat of the ſun; but in the evening, and in a moiſt ſtate of the air, they cloſe or contract their flowers, leſt the moiſture, getting to the duſt of the antheræ, ſhould coagulate the ſame, and render it incapable of being blown on the ſtigma; but, when once the fecundation is over, the flowers neither contract in the evening, nor yet againſt rain. The wind on many occaſions ſerves as a vehicle for bringing the farina of the males to the females. M. Geoffroy cites a ſtory from Jovius Pontanus, who relates that in his time there were two palm-trees, the one male, cultivated at Brindiſi, the other female, in the woods of Otranto, fifteen leagues apart; that this latter was ſeveral years without bearing any fruit; till at length, riſing above the other trees of the foreſt, ſo as it might ſee (ſays the poet) the male palm-tree at Brindiſi, it then began to bear fruit in abundance. M. Geoffroy makes no doubt but that the tree then only began to bear fruit, becauſe, it was in a condition to catch on its branches the farina of the male, brought thither by the wind. In the male and female of the piſtachia-nut-tree they obſerve the ſame method as in thoſe of the date-tree. We may obſerve farther, that, ſince the male duſt is generally of greater ſpecific gravity than the air, in moſt plants that have the piſtillum longer than the ſtamina, the all-wiſe Creator has made the flowers nodding, that the powder may more eaſily reach the ſtigma. With reſpect to thoſe plants whoſe ſtems grow under water, the flowers, a little before they blow, emerge or riſe above the ſurface of the water; and thoſe, all whoſe parts

grow

grow under water, about the time of flowering raiſe their genital ſtems above the water, which ſtems ſink again as ſoon as the time of generating is over. A ſimilar concluſion may be farther eſtabliſhed from the conſideration of all ſorts of flowers; but enough has been ſaid to prove that the generation of plants is performed by the genital duſt of the antheræ falling on the moiſt ſtigma, or female organ; which duſt, by the help of the moiſture, adheres and burſts, diſcharging its contents, the ſubtile particles of which are abſorbed by the ſtyle into the ovarium, germen, or ſeed-bud. However, the duſt of the antheræ does not penetrate through the ſtyle to the germen and rudiments of the ſeed, as ſome writers have ſuppoſed; the contrary appears to be the caſe from opening a flower of the oriental rough poppy, cutting its piſtillum perpendicularly downwards; and the lamellæ or folds, the placentæ, and the ſmall ſeeds ſticking to them, will be found of a pure white colour, though at the ſame time the ſtyle and all the ſtigmata are wholly tinged with a purple hue from the duſt of the antheræ. Hence, we conclude, that not one grain or particle of the farina enters the folds of the receptacle or ſeeds themſelves.

We may cloſe this account with obſerving upon the whole, that the calyx is the marriage-bed, in which the ſtamina and piſtilla, and male and female organs, celebrate the nuptials of plants, and where they are cheriſhed and defended from external injuries: the corolla or petals are the curtains cloſely ſurrounding the genital organs, in order to keep off ſtorm, rain, or cold; but, when the ſun ſhines bright, they freely expand, to give acceſs both to the ſun's rays and to the fecundating duſt: the filaments are the ſpermatic veſſels, by which the juice, ſecreted from the plant, is carried to the antheræ; the antheræ are the teſticles, and may not improperly be compared to the ſoft roe or milt of fiſhes: the duſt of the antheræ anſwers to the ſperm and ſeminal animalcules; for, though it is dry, that it may be the more eaſily conveyed by the wind, yet it gets moiſture by touching the ſtigma: the ſtigma is that external part of the female organ which receives the male duſt, and on which the male duſt acts: the ſtyle is the vagina, or tube, through which the effluvia of the male duſt paſs to the germen, or ſeed-bud: the germen is the ovary, for it contains the unimpregnated or unfertilized ſeeds: the pericarpium, or ſeed-veſſel, anſwers to the impregnated ovary, and in fact is the ſame with the germen, or ſeed-bud, only increaſed in bulk, and loaded with fertile ſeeds; the ſeeds are the eggs. Moreover, the calyx is a production of the external bark of the plant; the corolla of the inner bark; the ſtamina of the alburnum, or white ſap; the pericarpium, or ſeed-veſſel, of the woody ſubſtance; and the ſeeds of the pith of the tree; for in this manner they are placed, and in

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this manner alſo they are unfolded; ſo that in the flower we find all the internal parts of a plant unfolded.

The ſtomach of plants is the earth, from which they receive their nouriſhment; and the fineſt and moſt ſubtile parts of its ſoil is their chyle; the root, which carries the chyle from the ſtomach to the body of the plant, is analogous to the lacteals, or chyliferous veſſels, of animals: the trunk, which ſupports and gives ſtrength to the whole plant, is analogous to the bones; the leaves, by which plants tranſpire are inſtead of lungs, and they may be alſo compared to the muſcles of animals, for by their agitation with the wind the plant is put in motion; on which account, herbs furniſhed with leaves cannot thrive unleſs they have air; but ſucculent plants, which have no leaves, though ſhut up in green-houſes and quite deprived of the external air, thrive very well. Heat is to plants analogous to the heart in animals; for they have no heart, nor have they occaſion for any; becauſe they live like polypes in the animal kingdom; their juices mixed with air being propelled through their veſſels, but not circulated back again by returning veſſels. Plants have generally their genital organs placed at their ramifications, as animals have theirs at the ramification of the iliac veſſels, with this difference, that the ramifications of plants aſcend, whereas thoſe of animals go downwards or backwards; whence the ancients called a plant *an inverted animal.* Pliny obſerves, that there is in plants a natural inſtinct to generation; and that the males, by a certain blaſt and a ſubtle powder, do conſummate the nuptials on the females.

For the manner wherein the farina fecundifies, M. Geoffroy advances two opinions:—1. That the farina being always found of a ſulphureous compoſition, and full of ſubtile penetrating parts (as appears from its ſprightly odour), falling on the piſtils of the flowers, there reſolves, and the ſubtileſt of its parts, penetrating the ſubſtance of the piſtil and the young fruit, excite a fermentation to open and unfold the young plant, encloſed in the embryo of the ſeed. In this hypotheſis the ſeed is ſuppoſed to contain the plant in miniature, and only to want a proper juice to unfold its parts, and make them grow. 2. The ſecond opinion is, that the farina of the flower is the firſt germ or bud of the new plant, and needs nothing to unfold it, and enable it to grow, but the juice it finds prepared in the embryos of the ſeed. Theſe two theories of vegetable generation, the reader will obſerve, bear a ſtrict analogy to thoſe two of animal generation: viz. either that the young animal is in the ſemen maſculinum, and only needs the juice of the matrix to cheriſh and bring it forth; or that the animal is contained in the female ovum, and needs only the male ſeed to excite a fermentation, &c. M. Geoffroy rather takes the proper ſeed to be in the farina; inaſmuch as the beſt microſcopes do not diſcover the leaſt appearance of any bud in the little

embryos

embryos of the grains, when examined before the apices have ſhed their duſt. In leguminous plants, if the leaves and ſtamina be removed, and the piſtil, or that part which becomes the pod, be viewed with the microſcope, before the flower be opened; the little green tranſparent veſiculæ, which are to become the grains, will appear in their natural order; but ſtill ſhowing nothing elſe but the mere coat or ſkin of the grain. If the obſervation be continued for ſeveral days ſucceſſively, in other flowers, as they advance, the veſiculæ will be found to ſwell, and by degrees to become replete with a limpid liquor; wherein, when the farina comes to be ſhed, and the leaves of the flower to fall, we obſerve a little greeniſh ſpeck, or globule, floating about at large. At firſt there is not any appearance of organization in this little body; but in time, as it grows, we begin to diſtinguiſh two little leaves like two horns. The liquor diminiſhes inſenſibly, as the little body grows, till at length the grain becomes quite opaque; when, upon opening it, we find its cavity filled with a young plant in miniature; conſiſting of a little germ or *plumula*, a little root, and the lobes of the bean, or pea, &c.

The manner wherein this germ of the apex enters the veſicula of the ſeed, is not very difficult to determine. For, beſides that the cavity of the piſtil reaches from the top to the embryos of the grains, thoſe grains or veſiculæ have a little aperture correſponding to the extremity of the cavity of the piſtil, ſo that the ſmall duſt, or farina, may eaſily fall through the aperture into the mouth of the veſicula, which is the embryo of the grain. This cavity, or cicatricula, is much the ſame in moſt grains, and it is eaſily obſerved in peaſe, beans, &c. without the microſcope. The root of the little germ is juſt againſt this aperture, and through this it paſſes out when the little grain comes to germinate.

From what has been ſaid, it becomes evident, that, unleſs the female plant is impregnated by the male, it can bring forth no fruit, nor ſeed, that will grow. This holds good throughout the whole ſyſtem of vegetation. But, as trees and plants are immoveably fixed, and cannot like animals rove about in ſearch of a mate, the all-wiſe Creator has compenſated this, by means of little inſects, the bee, and the winds, which doubtleſs carry the pollen, or fecundating matter of the male, to the piſtilla of the female, whereby impregnation and generation follow. But as this, in the production of fruits, is rather a fortuitous event, which ſometimes happens in profuſion, and at others but ſparingly, thoſe who cultivate fruits have been led by art to aſſiſt nature in this neceſſary contact of the ſexes. While in Arabia, I was taken to ſee this curious operation performed on the date-tree, by which the Arabs always ſecure to themſelves a plentiful harveſt of that fruit, which is of ſo much importance to their traffic, and amongſt whom this art appears to have been known

long before any botaniſt dreamed of the difference of ſexes in vegetables. Of this the gardener informed me, but was ſurpriſed to find I knew the circumſtance before; "for (ſays he) all who come from Europe to this country have regarded this operation as a fable. When they obſerve a tree where the ſpadix has female flowers, they ſearch on a tree that has male flowers (which they know by cuſtom and experience) for a male ſpadix which has not yet burſt out of its ſpatha or huſk; this they open, take out the ſpadix, and cut it lengthwiſe in ſeveral pieces, taking care not to hurt the flowers. Theſe pieces of ſpadix with male flowers they put lengthwiſe between the ſmall branches of the ſpadix which hath female flowers, and then cover them over with a palm-leaf; in this ſituation the piſtilla of the female flower becomes impregnated by the male, which ſoon after withers and dies; and, unleſs the natives thus wed and fecundate the female date-tree, it bears no fruit. Or even if they permit the ſpadix of the male flower to burſt, or come out, before it is taken, it is uſeleſs for fecundation; it muſt for this purpoſe have its *maiden-head*, as the Arabs term it, or it will not do; and this is loſt the ſame moment the bloſſoms burſt out of their caſe." From this curious proceſs of nature in the generation of vegetables, and from a contemplation of the apparatus ſhe has contrived for that purpoſe, many uſeful hints may be derived how to alter, improve, enrich, and vary, the taſte, form, and quality, of fruits, &c. by impregnating the flower of one with the farina of another of the ſame claſs; and to this artificial coupling and mixing it is, that the numberleſs varieties of new fruits, flowers, &c. produced every year by our nurſery-men and gardeners, with many other phenomena in the vegetable kingdom, are to be aſcribed.

In the cultivation of many of our home-plants, we ſometimes meet with circumſtances not unſimilar to thoſe of the date-tree, which become barren when deprived of the males. Thus, if the flowers of the male hemp are pulled off before thoſe of the female are fully expanded, the females do not produce fertile ſeeds. But, as a male flower is ſometimes found upon a female plant, this may be the reaſon why fertile ſeeds are ſometimes produced even after this precaution has been obſerved. The tulip affords another experiment to the ſame purpoſe.—Cut off all the antheræ of a red tulip before the pollen is emitted; then take the ripe antheræ of a white tulip, and throw the pollen of the white one upon the ſtigma of the red; the ſeeds of the red tulip, being thus impregnated by one of a different complexion, will next ſeaſon produce ſome red, ſome white, but moſtly variegated, flowers.

In the year 1744, Linnæus publiſhed a deſcription of a new genus, which he called *peloria*, on the ſuppoſition of its being a hybrid or mule plant, i. e. a plant produced by an unnatural commixture of two different genera. The root, leaves, caulis, &c.

of

of this plant, are exceedingly ſimilar to thoſe of the Antirrhinum linaria, or common yellow toad-flax; but the flower and other parts of the fructification are totally different. On account of its ſimilarity to the linaria in every part but the flower, Linnæus imagined it to have been produced by a fortuitous commixture of the linaria with ſome other plant; and from this doctrine he ſuppoſes that only two ſpecies of each genus of plants exiſted *ab origine*, and that all the variety of ſpecies which now appear have been produced by unnatural embraces betwixt ſpecies of different genera. Under this head he defends the caſe of Richard Baal, gardener at Brentford. This Baal ſold a large quantity of the ſeeds of the Braſſica florida to ſeveral gardeners in the ſuburbs of London. Theſe gardeners, after ſowing their ſeeds in the uſual manner, were ſurpriſed to find them turn out to be plants of a different ſpecies from that which Baal made them believe they had purchaſed; for, inſtead of the Braſſica florida, the plants turned out to be the Braſſica longifolia. The gardeners, upon making this diſcovery, commenced a proſecution of fraud againſt Baal in Weſtminſter-hall. The court found Baal guilty of fraud, and decerned him not only to reſtore the price of the ſeeds, but likewiſe to pay the gardeners for their loſt time, and the uſe of their ground. "Had theſe judges (ſays Linnæus) been acquainted with the ſexual generation of plants, they would not have found Baal guilty of any crime, but would have aſcribed the accident to the fortuitous impregnation of the Braſſica florida by the pollen of the Braſſica longifolia."

With reſpect to the nouriſhment of plants, we need only recur to the analogy that is known to ſubſiſt between plants and animals. It is highly probable that the radical fibres of plants take up their nouriſhment from the earth, in the ſame manner that the lacteal veſſels abſorb the nutriment from the inteſtines; and, as the oily and watery parts of our food are perfectly united into a milky liquor, by means of the ſpittle, pancreatic juice, and bile, before they enter the lacteals, we have all the reaſon imaginable to keep up the analogy, and ſuppoſe that the oleaginous and watery parts of the ſoil are alſo incorporated, previous to their being taken up by the abſorbing veſſels of the plant. To form a perfect judgment of this, we muſt reflect that every ſoil, in a ſtate of nature, has in itſelf a quantity of abſorbent earth, ſufficient to incorporate its inherent oil and water; but, when we load it with fat manures, it becomes eſſentially neceſſary to beſtow upon it, at the ſame time, ſomething to aſſimilate the parts. Lime, ſoap-aſhes, kelp, marl, and all the alkaline ſubſtances, perform that office. In order to render this operation viſible to the ſenſes, diſſolve one dram of Ruſſia pot-aſh in four ounces of water; then add one ſpoonful of oil; ſhake the mixture, and it will inſtantly become an uniform maſs of a whitiſh colour, adapted to all the purpoſes of vegetation. This eaſy and familiar

familiar experiment is a juſt repreſentation of what happens after the operation of burn-baking, and conſequently may be conſidered as a confirmation of the hypotheſis advanced. In this proceſs, the ſward being reduced to aſhes, a fixed alkaline ſalt is produced; the moiſture of the atmoſphere ſoon reduces that ſalt into a fluid ſtate, which, mixing with the ſoil, brings about an union of the oily and watery parts, in the manner demonſtrated in the experiment. When the under ſtratum conſiſts of a rich vegetable mould, the effects of burn-baking will be laſting; but, when the ſoil happens to be thin and poor, the firſt crop frequently ſuffers before it arrives at maturity. The farmer, therefore, who is at the expenſe of paring and burning a thin ſoil, ſhould beſtow upon it a portion of rotten dung, or ſhambles manure, before the aſhes are ſpread, in order to ſupply the deficiency of oily particles: in this way the crop will be ſupported during its growth, and the land will be preſerved in health and vigour. But plants not only receive nouriſhment by their roots, but alſo by their leaves. Vegetables that have a ſucculent leaf, ſuch as vetches, peaſe, beans, and buck-wheat, draw a great part of their nouriſhment from the air, and on that account impoveriſh the ſoil leſs than wheat, oats, barley, or rye, the leaves of which are of a firmer texture. Rape and hemp are oil-bearing plants, and, conſequently, impoveriſhers of the ſoil; but the former leſs ſo than the latter, on account of the greater ſucculency of its leaf. The leaves of all kinds of grain are ſucculent for a time, during which period the plants take little from the earth; but, as ſoon as the ear begins to be formed, they loſe their ſoftneſs, and diminiſh in their attractive power. The radical fibres are then more vigorouſly employed in extracting the oily particles of the earth for the nouriſhment of the ſeed. The leaves of plants ſerve, not only as excretory ducts to ſeparate and carry off the redundant watery fluid, which, by being long detained in the plants, would turn rancid and prejudicial to them, but likewiſe to imbibe the dew and rain, which contain ſalt, ſulphur, &c. and to be of the ſame uſe to plants that the lungs are to animals. But, as plants have not a dilating and contracting thorax, their inſpirations and expirations will not be ſo frequent as thoſe of animals, but depend wholly on the alternate changes from hot to cold for inſpiration, and *vice verſa* for expiration. But the greater part of their nouriſhment is derived from the roots. Theſe, therefore, are found to bear a conſiderable proportion to the body of the plant above ground; the ſuperficies of the former being above four-tenths of that of the latter. Hence appears the neceſſity of cutting off many branches from a tranſplanted tree; becauſe, in digging it up, a great part of the root is cut off.

It is a curious occult fact, with reſpect to vegetables, that they thrive beſt from putrefaction, and flouriſh moſt in putrid air. Manure, though it has a ſtench almoſt

ſufficient

ſufficient to infect the blood, yet, if placed round plants and herbs, will make them grow ſurpriſingly; and we every day ſee how luxuriantly they will thrive upon a dunghill. Yet it is as true, that though theſe vegetables eagerly ſuck in and imbibe ſo foul a moiſture, and thrive in air ſo ſtrongly tainted with putrefaction, even in ſuch as would prove fatal to human life, yet thoſe very plants exhale a direct oppoſite effluvium, tending to refreſh and ſweeten the atmoſphere, and to render it wholeſome, when it is become noxious in conſequence of epidemical complaints, or of animals dying and putrifying in it; whence it follows that vegetables draw in the foul or infected corpuſcles, as favourable to their ſuſtenance, which being concocted, altered, and changed, in the body of the plant, it again emits them purified and ſweet. This I have proved by the following experiment: A quantity of air was made thoroughly noxious, by ſome mice breathing and dying in it. This I divided into two parts, in glaſs receivers. Into one I put a mouſe with a ſprig of mint, which lived very well, and the mint alſo flouriſhed; but in the other, where there was no mint, the mouſe died almoſt immediately. This experiment I have many times repeated with different kinds and portions of infected air, and have always found the reſult nearly the ſame; wherefore this plain reaſoning follows; that, as vegetables draw in by their leaves and roots the putrid effluvium of the air, ſo their emiſſion of purified corpuſcles contributes to make the remaining air more fit and wholeſome for reſpiration; and from this circumſtance I recommend all perſons who viſit the ſick, or have putrid diſorders in their families, to uſe as many freſh vegetables as poſſible, and never to be without ſome ſprigs of mint about them.

Of SYMPATHY, ANTIPATHY, SAGACITY, and OCCULT INSTINCT, in BRUTES.

BRUTE is a general name given to all animals except man; and an animal muſt be an organized living body, endowed with ſenſe; for minerals are ſaid to grow and increaſe, plants to grow and live; but animals alone are endowed with ſenſation. It is this property of ſenſation alone, that conſtitutes the eſſential characteriſtic of an animal; and by which the animal and vegetable kingdoms ſeem to be ſo materially ſeparated. Thoſe naturaliſts, who have ſuppoſed the diſtinction between animals and vegetables to conſiſt in any thing elſe than the gift of ſenſation, have found themſelves greatly embarraſſed; and have generally agreed, that it was extremely difficult, if not impoſſible, to ſettle the boundaries between the animal and vegetable kingdoms. But this difficulty will be eaſily ſeen to ariſe from their taking the characteriſtic marks of the animal kingdom from ſomething that was evidently common to both. Thus Boerhaave attempted to diſtinguiſh an animal from a vege-

table, by the former having a mouth, which the latter has not; but here, as the mouth of an animal is only the inſtrument by which nouriſhment is conveyed to its body, it is evident that this can be no eſſential diſtinction, becauſe vegetables, as we have above demonſtrated, require nouriſhment, and have inſtruments proper for conveying it into their bodies; and, where the end is the ſame, a difference in the means can never be eſſential. The fixing the difference in an animal's having a gula, ſtomach, and inteſtines, as is done by Dr. Tyſon, is as little to the purpoſe.

The power of moving from one place to another, hath by many been thought to conſtitute their eſſential difference; and indeed, in moſt caſes, it is the obvious mark by which we diſtinguiſh an animal from a vegetable; but Lord Kames hath given us ſeveral very curious inſtances of the locomotive power of plants; ſome of which would doubtleſs do honour to an animal.—Upon the ſlighteſt touch, the Mimoſa, or ſenſitive plant, ſhrinks back, and folds up its leaves,* as a ſnail, on the ſlighteſt touch, retires within its ſhell. If a fly perch upon one of its flower-leaves, it cloſes inſtantly, and cruſhes the inſect to death. There is not an article in botany more admirable than a contrivance, viſible in many plants, to take advantage of good weather, and to protect themſelves againſt bad. They open and cloſe their flowers and leaves in different circumſtances: ſome cloſe before ſunſet, ſome after; ſome open to receive rain, ſome cloſe to avoid it. The petals of many flowers expand in the ſun; but contract at night, or on the approach of rain. After the ſeeds are fecundated, the petals no longer contract. All the trefoils may ſerve as a barometer to the huſbandman; they always contract their leaves on an impending ſtorm. Some plants follow the ſun, others turn from it. Many plants, on the ſun receſs, vary the poſition of their leaves; which is ſtyled the *ſleep of plants*. A ſingular plant was lately diſcovered in Bengal: its leaves are in continual motion all day long; but, when night approaches, they fall down from an erect poſture to reſt.

A plant has a power of directing its roots for procuring food. The red whortleberry, a low ever-green plant, grows naturally on the tops of our higheſt hills, among ſtones and gravel. This ſhrub was planted in an edging to a rich border, under a fruit-wall. In two or three years, it over-ran the adjoining deep-laid gravel walk; and ſeemed to fly from the border, which was not congenial to its nature, and in which not a ſingle runner appeared. An effort to come at food in a bad ſituation, is extremely remarkable in the following inſtance: Among the ruins of New Abbey, formerly a monaſtery in Galloway, there grows on the top of a wall a plane-tree about twenty-feet high. Straitened for nouriſhment in that barren ſituation, it ſeveral years ago directed roots down the ſide of the wall, till they reached

* See a particular deſcription of the ſenſitive plant, in the Appendix to Culpeper, p. 27.

the

the ground ten feet below; and now the nouriſhment it afforded to thoſe roots during the time of their deſcending was amply repaid, having every year ſince that time made vigorous ſhoots. From the top of the wall to the ſurface of the earth, theſe roots have not thrown out any fibres; but are now united in a ſingle root.

Plants, when forced from their natural poſition, are endowed with a power to reſtore themſelves. A hop-plant, twiſting round a ſtick, directs its courſe from ſouth to weſt, as the ſun does. Untwiſt it, and tie it in the oppoſite direction; it dies. Leave it looſe in the wrong direction, it recovers its natural direction in a ſingle night. Twiſt a branch of a tree ſo as to invert its leaves, and fix it in that poſition; if left in any degree looſe, it untwiſts itſelf gradually, till the leaves recover their natural poſition. What better can an animal do for its welfare? A root of a tree, meeting with a ditch in its progreſs, is laid open to the air. What follows? It alters its courſe like a rational being; dips into the ground, undermines the ditch, riſes on the oppoſite ſide to its wonted diſtance from the ſurface, and then proceeds in its original direction. Lay a wet ſponge near a root laid open to the air; the root will direct its courſe to the ſponge. Change the place of the ſponge; the root varies its direction. Put a pole into the ground at a moderate diſtance from a ſcandent plant: the plant directs its courſe to the pole, lays hold of it, and riſes on to its natural height. A honeyſuckle proceeds in its courſe, till it is too long for ſupporting its weight; and then ſtrengthens itſelf by ſhooting into a ſpiral. If it meets with another plant of the ſame kind, they coaleſce for mutual ſupport; the one ſcrewing to the right, the other to the left. If a honeyſuckle-twig meets with a dead branch, it ſcrews from the right to the left. The claſpers of briony ſhoot into a ſpiral, and lay hold of whatever comes in their way for ſupport. If, after completing a ſpiral of three rounds, they meet with nothing, they then try again for further ſupport, by altering their courſe.

By comparing theſe and other inſtances of ſeeming voluntary motion in plants, with that ſhare of life wherewith ſome of the inferior kinds of animals are endowed, we can ſcarcely heſitate in aſcribing the ſuperiority to the former; that is, putting ſenſation out of the queſtion. Muſcles, for inſtance, are fixed to one place, as much as plants are; nor have they any power of motion, beſides that of opening and ſhutting their ſhells; and in this reſpect they have no ſuperiority over the motion of the ſenſitive plant; nor doth their action diſcover more ſagacity, or even ſo much, as the roots of the plane-tree, or the action of other vegetables.

M. Buffon, who ſeems to be deſirous of confounding the animal and vegetable kingdoms, denies ſenſation to be any eſſential diſtinction. "Senſation (ſays he) more eſſentially diſtinguiſhes animals from vegetables; but ſenſation is a complex idea,

idea, and requires ſome explication. For, if ſenſation implied no more than motion conſequent upon a ſtroke or an impulſe, the ſenſitive plant enjoys this power; but if, by ſenſation, we mean the faculty of perceiving and comparing ideas, it is uncertain whether brute animals are endowed with it. If it ſhould be allowed to dogs, elephants, &c. whoſe actions ſeem to proceed from motives ſimilar to thoſe by which men are actuated, it muſt be denied to many ſpecies of animals, particularly to thoſe which appear not to poſſeſs the faculty of progreſſive motion. If the ſenſation of an oyſter, for example, differed only in degree from that of a dog; why do we not aſcribe the ſame ſenſation to vegetables, though in a degree ſtill inferior? This diſtinction, therefore, between the animal and vegetable, is neither ſufficiently general nor determined. Hence we are led to conclude, that there is no abſolute and eſſential diſtinction between the animal and vegetable kingdoms; but that nature proceeds, by imperceptible degrees, from the moſt perfect to the moſt imperfect animal, and from that to the vegetable; and thus, the freſh-water polypus may be regarded as the laſt of animals and the firſt of plants."

It were to be wiſhed, that philoſophers would on ſome occaſions conſider, that a ſubject may be dark as well on account of their inability to ſee, as when it really affords no light. This great author boldly concludes, that there is no eſſential difference between a plant and an animal, becauſe we aſcribe ſenſation to an oyſter, and none to the ſenſitive plant; but we ought to remember, that, though we cannot perceive a diſtinction, it may nevertheleſs exiſt. Before M. Buffon, therefore, had concluded in this manner, he ought to have proved that ſome vegetables were endowed with ſenſation.

It is no doubt, however, as much incumbent on thoſe who take the contrary ſide of the queſtion, to prove that vegetables are not endowed with ſenſation, as it was incumbent on M. Buffon to prove that they are. But a little attention will ſhow us, that the difficulty here proceeds entirely from our inability to ſee the principle of ſenſation. We perceive this principle in ourſelves, but no man can perceive it in another. Why then does every individual of mankind conclude, that his neighbour has the ſame ſenſations with himſelf? It can only be from analogy. Every man perceives his neighbour formed in a manner ſimilar to himſelf; he acts in a ſimilar manner on ſimilar occaſions, &c. Juſt ſo it is with brute animals. It is no more doubtful that they have ſenſations, than that we have them ourſelves. If a man is wounded with a knife, for inſtance, he expreſſes a ſenſe of pain, and endeavours to avoid a repetition of the injury. Wound a dog in the ſame manner, he will alſo expreſs a ſenſe of pain; and, if you offer to ſtrike him again, will endeavour to eſcape,

eſcape, before he feels the ſtroke. To conclude here, that the action of the dog proceeded from a principle different from that of the man, would be abſurd and unphiloſophical to the laſt degree.

We muſt farther take notice, that there are ſenſations eſſentially diſtinct from one another; and in proportion as an animal is endowed with more or fewer of theſe different ſpecies, it is more or leſs perfect as an animal: but, as long as only one of them remains, it makes not the leaſt approach to the vegetable kingdom; and, when they are all taken away, is ſo far from becoming a vegetable, that it is only a maſs of dead matter. The ſenſes of a perfect animal, for inſtance, are five in number. Take away one of them, ſuppoſe ſight, he becomes then a leſs perfect animal; but is as unlike a vegetable as before. Suppoſe him next deprived of hearing, his reſemblance to a vegetable would be as little as before; becauſe a vegetable can neither feel, taſte, nor ſmell; and we ſuppoſe him ſtill to enjoy theſe three ſenſes. Let us, laſtly, ſuppoſe him endowed only with the ſenſe of feeling, which however ſeems to include that of taſte, and he is no more a vegetable than formerly, but only an imperfect animal. If this ſenſe is then taken away, we connect him not with the vegetable kingdom, but with what M. Buffon calls brute-matter. It is to this kingdom, and not to the vegetable, that animals plainly approximate as they deſcend. Indeed, to ſuppoſe an approximation between the vegetable and animal kingdoms, is very abſurd; for, at that rate, the moſt imperfect animal ought to be the moſt perfect plant: but we obſerve no ſuch thing. All animals, from the higheſt to the loweſt, are poſſeſſed of vegetable life; and that, as far as we can perceive, in an equal degree, whether the animal life is perfect or imperfect: nor doth there ſeem to be the ſmalleſt connection between the higheſt degree of vegetation and the loweſt degree of ſenſation. Though all animals are poſſeſſed of vegetable life, theſe two ſeem to be as perfectly diſtinct and incommenſurate to one another, as any two things we can poſſibly imagine.

The power of vegetation, for inſtance, is as perfect in an onion or leek, as in a dog, an elephant, or a man: and yet, though you threaten a leek or an onion ever ſo much, it pays no regard to your words, as a dog would do: nor, though you wound it, does it avoid a ſecond ſtroke. It is this principle of ſelf-preſervation in animals, which, being the moſt powerful one in their nature, is generally taken, and with very good reaſon, as the true characteriſtic of animal life. This principle is undoubtedly a conſequence of ſenſation; and, as it is never obſerved to take place in vegetables, we have a right to ſay that the foundation of it, namely, ſenſation, belongs not to them. There is no animal, which makes any motion in conſequence of external impulſe where danger is threatened, but what puts itſelf in a

poſture of defence; but no vegetable whatever does ſo. A muſcle, when it is touched, immediately ſhuts its ſhell; and, as this action puts it in a ſtate of defence, we conclude that it proceeded from the principle of ſelf-preſervation. When the ſenſitive plant contracts from a touch, it is no more in a ſtate of defence than before; for whatever would have deſtroyed it in its expanded ſtate, will alſo do ſo in its contracted ſtate. The motion of the ſenſitive plant proceeds only from a certain property called *irritability;* and which, though our bodies poſſeſs it in an eminent degree, is a characteriſtic neither of animal nor vegetable life, but belongs to us in common with brute-matter. It is certain, that an electrified ſilk thread ſhows a much greater variety of motions than any ſenſitive plant. If a bit of ſilk thread is dropt on an electrified metal plate, it immediately erects itſelf; ſpreads out the ſmall fibres like arms; and, if not detained, will fly off. If a finger is brought near it, the thread ſeems greedily to catch at it. If a candle approaches, it claſps cloſe to the plate as if afraid of it. Why do we not conclude that the thread in this caſe is really afraid of the candle? For this plain reaſon, that its ſeeming flight is not to get away from the candle, but to get towards the electrified metal; and, if allowed to remain there, will ſuffer itſelf to be burnt without offering to ſtir. The ſenſitive plant, in like manner, after it has contracted, will ſuffer itſelf to be cut to pieces, without making the leaſt effort to eſcape. The caſe is not ſo with the meaneſt animal. An hedge-hog, when alarmed, draws its body together, and expands its prickles, thereby putting itſelf in a poſture of defence. Throw it into water, and the ſame principle of ſelf-preſervation prompts it to expand its body and ſwim. A ſnail, when touched, withdraws itſelf into its ſhell, but if a little quicklime is ſprinkled upon it, ſo that its ſhell is no longer a place of ſafety, it is thrown into agonies, and endeavours to avail itſelf of its locomotive power in order to eſcape the danger. In muſcles and oyſters, indeed, we cannot obſerve this principle of ſelf-preſervation ſo ſtrongly, as nature has deprived them of the power of progreſſive motion: but, as we obſerve them conſtantly to uſe the means which nature has given them for ſelf-preſervation, we can have no reaſon to think that they are deſtitute of that principle upon which it is founded.

But there is no need of arguments drawn from the inferior creation. We ourſelves are poſſeſſed both of the animal and vegetable life, and certainly muſt know whether there is any connection between vegetation and ſenſation or not. We are conſcious that we exiſt; that we hear, ſee, &c. but of our vegetation we are abſolutely unconſcious. We feel a pleaſure, for inſtance, in gratifying the calls of hunger and thirſt; but of the proceſs by which our aliment improves our growth and vigour, we are altogether ignorant. If we, then, who are more perfect than other

vegetables,

vegetables, are utterly inſenſible of our own vegetable life, why ſhould we imagine that the leſs perfect vegetables are ſenſible of it?

To illuſtrate our reaſoning here by an example. The direction of the roots of the plane-tree, mentioned above, ſhows as much ſagacity, if we are to look only to the outward action, as can be obſerved in any motion of the moſt perfect animal whatever; nevertheleſs, we have not the leaſt ſuſpicion, either that the tree ſaw the ground at a diſtance, or that it was informed of its being there by the reſt of its roots. If a wound is made in the body of a man, and a loſs of ſubſtance is to be repaired, the ſame ſagacity will be obſerved in the arrangement of the fibres, not only as if they were animated, but they will diſpoſe of themſelves ſeemingly with a degree of wiſdom far ſuperior to what we have any idea of; yet this is done without our having the leaſt knowledge either how it is done, or of its being done at all. We have therefore in ourſelves a demonſtration, that vegetable life acts without our knowing what it does: and, if vegetables are ignorant of their moſt ſagacious actions, why ſhould we ſuſpect that we have a ſenſation, let it be ever ſo obſcure, of any of their inferior ones, ſuch as contracting from a touch, turning towards the ſun, or advancing to meet a pole? Thus we may eaſily give M. Buffon a reaſon why we aſcribe ſenſation to an oyſter, and none to a vegetable; namely, becauſe we perceive the vegetable to do nothing but what is alſo performed in our own bodies without our having the leaſt ſenſation of it; whereas an oyſter puts itſelf in a defenſive poſture on the approach of danger; and, this being an action ſimilar to our own upon a like occaſion, we conclude that it proceeds from the ſame principle of ſenſation. Here it may alſo be obſerved, that, though the inferior animals are deficient in the number, they are by no means ſo in the acuteneſs of their ſenſation; on the contrary, though a muſcle or an oyſter is probably endowed with no other ſenſe than that of feeling, yet this ſenſe is ſo exquiſite, that it will contract upon the ſlighteſt touch, ſuch as we ſhould altogether be inſenſible of.

As to that power of contractility, or irritability, which is obſerved in ſome plants; our ſolids have it, when deprived both of vegetable and animal life; for the human heart, or a muſcle, cut out of an animal body, will continue to contract, if it is irritated by pricking it, after it has neither ſenſation nor vegetation.

A very good moral reaſon may alſo be adduced, why vegetables are not endowed with ſenſation. Had they been ſo, we may ſuppoſe them to ſuffer pain when they are cut or deſtroyed; and, if ſo, what an unhappy ſtate muſt they be in, who have not the leaſt power to avoid the injuries daily offered them? In fact, the goodneſs of the Deity is very conſpicuous in not giving to vegetables the ſame ſenſations as to animals; and, as he hath given them no means of defence, though we had not

been

been told it by himſelf, we might have known that he gave them for food to animals; and, in this caſe, to have endowed them with ſenſation would have been cruelty. Though animals without number prey upon one another, yet all of them have ſome means of defence; from whence we juſtly conclude, that their mutual deſtruction was not an original appointment of the Creator, but what followed from the fall of Adam, and what he foreſaw would happen in a courſe of time, and which he therefore gave every one of them ſome means of guarding againſt. It may no doubt be here objected, that the giving ſome means of ſelf-defence to every animal cannot be reckoned a ſufficient proof that it was not the original deſign of the Creator that they ſhould be deſtroyed, ſeeing theſe means are not always effectual for their preſervation. This objection, however, cannot be completely obviated without a ſolution of the queſtion concerning the origin of evil among the works of a perfectly-good Being. But, whatever difficulty there may be in ſolving this queſtion, it is certain, that, as ſome means of ſelf-defence is given to every animal, it has been the original deſign of the Creator, that in all caſes one ſpecies of animals ſhould not be deſtroyed at the pleaſure or will of any other ſpecies: and, as no means of ſelf-defence is given to any vegetable, it is plain that they have been deſtined for a prey to every ſpecies of animals that had acceſs to them. Philoſophers have inſiſted much on the neceſſity of one animal's devouring another, that there might be room ſufficient for all; but this, ſo far from being a ſyſtem worthy of the divine wiſdom, ſeems to be a reflection upon it, as if the Author of Nature could not have found means to preſerve the life of one part of his creatures, without the deſtruction and miſery of the reſt. The ſacred writings leave us at no loſs to ſee how this carnivorous diſpoſition came in; and in the next world, this piece of perfection (as the ſanguinary philoſophers above-mentioned would have it to be) ſeems to be left out; for there, it is ſaid, "They ſhall not hurt nor deſtroy; the lion ſhall eat ſtraw like the ox; and there ſhall be no more pain." Iſa. xi. 7, 9. Rev. xxi. 4.

Of ANIMAL FLOWERS.

The grand argument for animal life in vegetables, was inferred from the curious conſtruction of the freſh-water polypus, and the *actinia* genus, called animal flowers, ſea-anemone, ſea-ſunflower, &c. which, having indeed the external form and figure of vegetables, with ſcarcely any progreſſive motion, might eaſily deceive ſuperficial obſervers; but, when more minutely examined, the polypus, and all the actinia claſs, turn out to be abſolute animals, of the viviparous kind, and feed on fiſh; the heads or mouths of which, when open, reſemble a full-blown flower, whence they

they are called flower-fiſh. There is one ſpecies of them, in which the pureſt white, carmine, and ultramarine, are ſcarcely ſufficient to expreſs their brilliancy. The bodies of ſome of them are hemiſpherical, of others cylindrical, and of others ſhaped like a fig. Their ſubſtance likewiſe differs; ſome are ſtiff and gelatinous, others fleſhy and muſcular; but all of them are capable of altering their figure when they extend their bodies and claws in ſearch of food. They are found on many of the rocky coaſts of the Weſt-India iſlands, and on ſome parts of the coaſt of England. They have only one opening, which is in the centre of the uppermoſt part of the animal; round this are placed rows of fleſhy claws; this opening is the mouth of the animal, and is capable of great extenſion. The animals themſelves, though exceedingly voracious, will bear long faſting. They may be preſerved alive a whole year, or perhaps longer, in a veſſel of ſea-water, without any viſible food; but, when food is preſented, one of them will ſucceſſively devour two muſcles in their ſhells, or even ſwallow a whole crab as large as a hen's egg. In a day or two the crab-ſhell is voided at the mouth, perfectly cleared of all the meat. The muſcle-ſhells are likewiſe diſcharged whole, with the ſhells joined together, but entirely empty, ſo that not the leaſt particle of fiſh is to be perceived on opening them. An anemone of one ſpecies will even ſwallow an individual of another ſpecies; but, after retaining it ten or twelve hours, will throw it up alive and uninjured. Through this opening alſo it produces its young ones alive, already furniſhed with little claws, which, as ſoon as they fix themſelves, they begin to extend in ſearch of food. One of the extremities of the ſea-anemone exactly reſembles the outward leaves of that flower; while its limbs are not unlike the ſhag or inner part of it. By the other extremity it fixes itſelf, as by a ſucker, to the rocks or ſtones lying in the ſand; but it is not totally deprived of the power of progreſſive motion, as it can ſhift its ſituation, though very ſlowly.

A peculiar ſpecies of animal-flowers, called the cluſtered animal-flower, has been found in ſome of the Weſt-India iſlands, an account of which was publiſhed in the Philoſophical Tranſactions, vol. lvii. by Mr. Ellis, in a letter to Lord Hillſborough. This compound animal, which is of a tender fleſhy ſubſtance, conſiſts of many tubular bodies, ſwelling gently towards the upper part, and ending like a bulb or very ſmall onion; on the top of each is its mouth, ſurrounded by one or two rows of tentacles, or claws, which when contracted look like circles of beads. The lower part of all theſe bodies has a communication with a firm fleſhy wrinkled tube, which ſticks faſt to the rocks, and ſends forth other fleſhy tubes, which creep along them in various directions. Theſe are full of different ſizes of theſe

remarkable animals, which riſe up irregularly in groups near to one another. This adhering tube, that ſecures them faſt to the rock, or ſhelly bottom, is worthy of our notice. The knobs are formed into ſeveral parts of it by its inſinuating itſelf into the inequalities of the coral rock, or by graſping pieces of ſhells, part of which ſtill remain in it, with the fleſhy ſubſtance grown over them. This ſhows us the inſtinct of nature, that directs theſe animals to preſerve themſelves from the violence of the waves, not unlike the anchoring of muſcles by their fine ſilken filaments that end in ſuckers; or rather like the ſhelly baſis of the ſerpula, or worm-ſhell, the tree-oyſter, and the ſlipper barnacle, &c. whoſe baſes conform to the ſhape of whatever ſubſtance they fix themſelves to, graſping it faſt with their teſtaceous claws, to withſtand the fury of a ſtorm. When we view the inſide of this animal diſſected lengthwiſe, we find a little tube leading from the mouth to the ſtomach, from whence there riſe eight wrinkled ſmall guts, in a circular order, with a yellowiſh ſoft ſubſtance in them; theſe bend over in the form of arches towards the lower part of the bulb, whence they may be traced downwards, to the narrow part of the upright tube, till they come to the fleſhy adhering tube, where ſome of them may be perceived entering into the papilla, or the beginning of an animal of the like kind, moſt probably to convey it nouriſhment till it is provided with claws; the remaining part of theſe ſlender guts are continued on in the fleſhy tube, without doubt for the purpoſe of producing and ſupporting more young from the ſame common parent.

The Abbé Dicquemarre, by many curious though cruel experiments, related in the Phil. Tranſ. for 1773, has ſhown that theſe animals poſſeſs, in a moſt extraordinary degree, the power of reproduction; ſo that ſcarcely any thing more is neceſſary to produce as many ſea-anemones as we pleaſe, than to cut a ſingle one into as many pieces. A ſea-anemone being cut in two by a ſection through the body, that part, where the limbs and mouth are placed, ate a piece of muſcle offered to it ſoon after the operation, and continued to feed and grow daily for three months after. The food ſometimes paſſed through the animal; but was generally thrown up again, conſiderably changed, as in the perfect ſea-anemone. In about two months, two rows of limbs and a mouth were perceived growing out of the part where the inciſion was made. On offering food to this new mouth, it was laid hold of and eaten; and, the limbs continually increaſing, the animal gradually became as perfect as thoſe which had never been cut. In ſome inſtances, however, when one of theſe creatures was cut through, new limbs would be produced from the cut place, thoſe at the mouth remaining as before; ſo that a monſtrous animal was the conſequence, having two mouths, and feeding at both ends.

Under

Under a large hollow cliff, in the iſland of Barbadoes, where the ſea flows up, and forms a baſon, there is a fixed ſtone, or piece of rock, in the middle, which is always under water. Round its ſides, at different depths, ſeldom exceeding eighteen inches, are ſeen at all times of the year, iſſuing out of little holes, certain ſubſtances that have the appearance of fine radiated flowers, of a pale yellow, or a bright ſtraw colour, ſlightly tinged with green, having a circular border of thick-ſet petals, about the ſize of, and much reſembling, thoſe of a ſingle garden-marigold, except that the whole of this ſeeming flower is narrower at the diſcus, or ſetting-on of the leaves, than any flower of that kind. Mr. Hughes, in his Hiſtory of Barbadoes, gives the following curious account of them: "I have attempted to pluck one of theſe animal-flowers from the rock to which they are fixed; but never could effect it; for, as ſoon as my fingers came within two or three inches of it, it would immediately contract together its yellow border, and ſhrink back into the hole of the rock; but, if left undiſturbed for about four minutes, it would come gradually in ſight, expanding, though at firſt very cautiouſly, its ſeeming leaves, till at laſt it appeared in its former bloom. However, it would again recoil, with a ſurpriſing quickneſs, when my hand came within a ſmall diſtance of it. Having tried the ſame experiment by attempting to touch it with my cane, and a ſmall ſlender rod, the effect was the ſame. But, though I could not by any means contrive to take or pluck one of theſe animals entire, yet I cut off (with a knife which I had held for a long time out of ſight, near the mouth of a hole out of which one of theſe animals appeared) two of theſe ſeeming leaves. Theſe, when out of the water, retain their ſhape and colour; but, being compoſed of a membrane-like ſubſtance, ſurpriſingly thin, they ſoon ſhrivelled up, and decayed." The reproductive power of the Barbadoes animal-flower is prodigious. Many people coming to ſee theſe ſtrange creatures, and occaſioning ſome inconvenience to a perſon through whoſe grounds they were obliged to paſs, he reſolved to deſtroy the object of their curioſity; and, that he might do ſo effectually, he cauſed all the holes out of which they appeared, to be carefully bored and drilled with an iron inſtrument, ſo that we cannot ſuppoſe but their bodies muſt have been entirely cruſhed to a pulp: nevertheleſs they again appeared in a few weeks in ſtill greater abundance, from the very ſame places.

The ſea-carnation, or animal-flower, found among the rocks at Haſtings in Suſſex, is very ſimilar to the animal-flower of Barbadoes. This animal adheres by its tail, or ſucker, to the under part of the projecting rocks oppoſite the town; and, when the tide is out, has the appearance of a long white fig; which is alſo the form of it when put into a glaſs of ſea-water.

Of the POLYPUS.

THE Polype, or Polypus, which ſo long divided naturaliſts in opinion whether it was of vegetable or animal conformation, is a freſh-water animal, of the hydra genus, in the claſs of worms, and order of *zoophytes*, in the Linnæan ſyſtem. It is of a cylindrical figure, but variable, with very long tentacula, or claws. There is ſcarcely an animal in the world more difficult to deſcribe, than this ſurpriſing worm; it varies its whole figure at pleaſure, and is frequently found beſet with young in ſuch a manner as to appear ramoſe and divaricated; theſe young ones adhering to it ſo as to appear parts of its body.

When ſimple and in a moderate ſtate as to contraction or dilation, it is oblong, ſlender, pellucid, and of a pale-reddiſh colour; its body is ſomewhat ſmaller towards the tail, by which it fixes itſelf to ſome ſolid body: and larger towards the other extremity, where it has a larger opening, called its mouth, around which are the tentacula, or claws, which are eight in number, and are uſually extended to about half the length of its body. By means of theſe tentacula, or arms, as they are commonly called, expanded into a circle of more than half a foot diameter, the creature feels every thing that can ſerve it for food; and, ſeizing the prey with one of them, calls in the aſſiſtance of the others, if neceſſary, to conduct it to its mouth.

The production of its young is different from the common courſe of nature in other animals; for the young one iſſues from the ſide of its parent in the form of a ſmall pimple, which, lengthening every hour, becomes, in about two days, a perfect animal, and drops from off its parent to ſhift for itſelf: but, before it does this, it has often another growing from its ſide; and ſometimes a third from that, even before the firſt is ſeparated from its parent; and what is very extraordinary, there has never yet been diſcovered among them any diſtinction of ſex, or appearance of copulation; every individual of the whole ſpecies being prolific, and that as much if kept ſeparate as if ſuffered to live among others; but what is even ſtill more ſurpriſing, is the reproduction of its ſeveral parts when cut off; for, when cut into a number of ſeparate pieces, it becomes in a day or two ſo many diſtinct and ſeparate animals; each piece having the property of producing a head and tail, and the other organs neceſſary for life, and all the animal functions.

There is no diſtinguiſhed place in the body of the polypus, from whence the young are brought forth; for they ſpring out like ſhoots or branches of a tree, from all the exterior parts of their bodies. M. Trembley, who had heard much of this creature, and being determined to convince himſelf, by real experiments, whether it was a vegetable or an animal, cut one in the middle, when, to his utter amaze-

ment,

Animal-Flowers, or Flower-Fish.

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ment, he found that in two days each of thoſe pieces was become a perfect animal, the head-part having ſhot forth a tail, and the tail a head. Numerous trials of a ſimilar nature have been made in my own laboratory; and I have always found that it is of no conſequence how often you cut them, for they ſtill put out new members, and become ſo many diſtinct polypes.

They are always to be found in clear ſlowly-running waters, adhering by the tail to ſticks, ſtones, and water-plants, and live on ſmall inſects. They are eaſily kept alive a long time in glaſſes, often changing the water, keeping the glaſſes clean, and feeding them with a ſmall red worm, common in the mud of the Thames, or with other ſmall inſects. The creature has its name from the Greek πολυς, many, and πους, a foot, ſignifying an animal with many feet; but a more appoſite one might eaſily have been invented, ſince it has in reality no feet at all. What were originally taken for feet, are what have ſince been called its horns, and of late more properly its arms, their office being to catch its prey. With theſe little arms, which are capable of great extenſion, it ſeizes minute worms, and various kinds of water-inſects, and brings them to its mouth: and, like the ſea-anemone, often ſwallows bodies larger than itſelf: having a ſurpriſing property of extending its mouth wider, in proportion, than any other animal. After its food is digeſted in its ſtomach, it returns the remains of the animals upon which it feeds through its mouth again, having no other obſervable emunctory. In a few days there appear ſmall knobs or papillæ on its ſides; as theſe increaſe in length, little fibres are ſeen riſing out of the circumference of their heads, as in the parent animal; which fibres they ſoon begin to uſe for the purpoſe of procuring nouriſhment, &c. When theſe are arrived at mature ſize, they ſend out other young ones on their ſides in the ſame manner; ſo that the animal branches out into a numerous offspring, growing out of one common parent, and united together and diſpoſed in the manner repreſented in the annexed plate. Each of theſe provides nouriſhment not only for itſelf, but for the whole ſociety; an increaſe of the bulk of one polype, by its feeding, tending to an increaſe in the reſt. Thus a polype of the freſh-water kind becomes like a plant branched out, or compoſed of many bodies, each of which has this ſingular characteriſtic, that, if one of them be cut in two in the middle, the ſeparated part becomes a complete animal, and ſoon, adhering to ſome fixed baſe, like the parent from which it was ſeparated, produces a circle of arms; a mouth is formed in the centre; it increaſes in bulk, emits a numerous progeny, and is ſoon, in every reſpect, as perfect an animal as that from which it was ſevered.

The ſeveral ſtrange properties recorded of the polypes and animal flowers, though very ſurpriſing, are not, however, peculiar to them alone. The Surinam toad is well

known to produce its young, not in the ordinary way, but in cells upon its back. And, as to the moſt amazing of their properties, the re-production of their parts, we know the crab and lobſter, if a leg be broken off, can always produce a new one.

I have annexed a copper-plate of ſome excellent drawings of theſe curious phenomena in nature; in which No. 1 repreſents the freſh-water polype, with its tentacula or arms extended upwards. No. 2 repreſents the ſame animal, with its young branching from it, and putting out their claws for food, which, howſoever taken, goes to the common ſupport of the whole family. No. 3 ſhows the animal carnation-flower of the rocks near Haſtings in Suſſex, with its tentacles extended in ſearch of food. No. 4 is an exact repreſentation of the ſea-anemone, above deſcribed. No. 5 ſhows the head of the animal-flower of Barbadoes. No. 6 is a brilliant diſplay of the ſea ſun-flower animal, with its innumerable tentacles expanded to catch its prey, which being allured to it by its elegant appearance, they cloſe inſtantly upon it, and convey it to the interior concavity or mouth. No. 7 repreſents a cluſter of the animal-flower deſcribed by Mr. Ellis, in the iſlands ceded by France; in which *a* ſhows one of the animals ſtretching out its tentacles in ſearch of food. No. 8 is a perpendicular diſſection of one of the ſame animals, in order to ſhow the gullet, inteſtines, ſtomach, and the fibres or tendons that move the claws.

Of ANIMALCULES.

THE next moſt ſurpriſing part of animal nature, is that of animalcules, an innumerable tribe of living beings, wholly inviſible to the naked eye, and which cannot even be perceived to exiſt, but by the aſſiſtance of microſcopes. The ſmalleſt living creatures our inſtruments can ſhow, are thoſe that inhabit the waters; for, though poſſibly animalcules equally minute, or perhaps more ſo, may fly in the air, or creep upon the earth, it is ſcarcely poſſible to bring ſuch under our examination; but, water being tranſparent, and confining the creatures in it, we are able, by applying a drop of it to our glaſſes, to diſcover, to a certain degree of ſmallneſs, all that it contains.—Some of the moſt curious of theſe animalcules, which have been deſcribed by microſcopical obſervers, are as follow.

1. *The Hair-like Inſect.* This is ſo called on account of its ſhape; being extremely ſlender, and frequently an hundred and fifty times as long as broad. The body or middle part, which is nearly ſtraight, appears, in ſome, compoſed of ſuch rings as the windpipe of land-animals; but, in others, ſeems rather ſcaled, or made up of rings that obliquely croſs one another. Its two ends are hooked or bent, pretty nearly in the ſame degree, but in a direction oppoſite to one another; and, as no eyes can

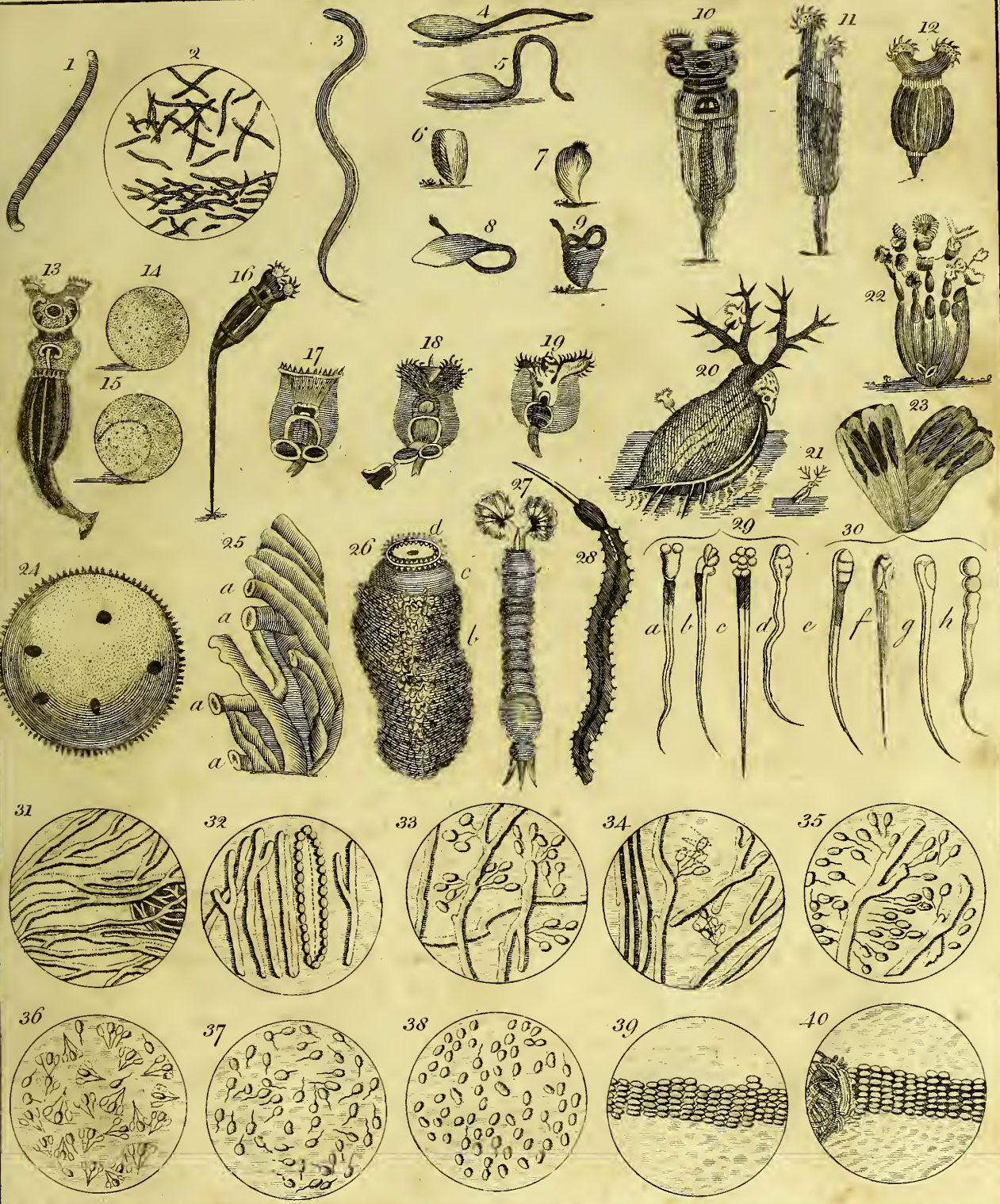
can be diſcerned, it is difficult to judge which is the head or tail. Its progreſſive motion is very ſingular, being performed by turning upon one end as a centre, and deſcribing almoſt a quarter of a circle with the other; its ſhape and form may be ſeen greatly magnified in the following curious Plate of Animalcules, at fig. 1. Its motions are very ſlow, and require much patience and attention in the obſerver. Theſe creatures are ſo ſmall, that millions of millions of them might be contained in the circle, fig. 2. When viewed ſingly, they are exceedingly tranſparent, and of a beautiful green colour; but, when numbers of them are brought together, they become opaque, loſe their green colour, and grow entirely black. The hair-like inſect was firſt diſcovered in a ditch at Norwich, one end of which communicates with the river there, and the other end with a ſecond ditch, into which ſeveral kennels empty themſelves. The length of this ditch was at leaſt a hundred yards, and its breadth nine. The bottom, for more than a foot thick, was covered with a blackiſh green ſubſtance in appearance like mud, made up for the moſt part of theſe inſects; but, ſuppoſing only half or a quarter part of it to be compoſed of them, according to the above dimenſions, their numbers muſt exceed all imagination.

2. *Eels in Paſte*, &c. When paſte is allowed to ſtand till it becomes ſour, it is then found to be the habitation of numberleſs animalcules, which may be diſcerned by the naked eye; and, though their form cannot be perfectly diſtinguiſhed, their motion is very perceptible, and the whole paſte will ſeem to be animated. Fig. 3 repreſents one of theſe anguillæ highly magnified. The moſt remarkable property of theſe inſects is, that they are viviparous. If one of them is cut through near the middle, ſeveral oval bodies, of different ſizes, will be ſeen to iſſue forth. Theſe are young anguillæ, each of them coiled up and incloſed in its proper membrane, which is ſo exquiſitely fine, as ſcarce to be diſcernible by the greateſt magnifier, while it incloſes the embryo animal. The largeſt and moſt forward immediately break through this covering, unfold themſelves, and wriggle about in the water nimbly; others get out, uncoil, and move themſelves about more ſlowly; and the leaſt mature continue entirely without motion. The *uterus*, or veſſel that contains all theſe oval bodies, is compoſed of many ringlets, not unlike the aſpera arteria of land-animals, and ſeems to be conſiderably elaſtic; for, as ſoon as the animalcule is cut in two, the oval bodies are thruſt out with ſome degree of violence, from the ſpringing-back or action of this bowel. An hundred and upwards of the young ones have been ſeen to iſſue from the body of one ſingle eel, whereby the prodigious increaſe of them may be acounted for; as probably ſeveral ſuch numerous generations are produced in a ſhort time. Animalcules of a ſimilar kind are likewiſe found in vinegar; and, like thoſe already deſcribed, are found to be viviparous. But it is not only in acid matters that ſuch appearances are obſerved. In

ſome

ſome fields of wheat, many grains may be obſerved, that appear blackiſh outwardly, as if ſcorched; but when opened, are found to contain a ſoft white ſubſtance, which, attentively conſidered, appears to be nothing elſe than a congeries of threads or fibres, lying cloſe to each other in a parallel direction, much reſembling the unripe down of ſome thiſtles on cutting open the flower-heads before they begin to blow. This fibrous matter diſcovers not the leaſt ſign of life or motion, unleſs water is applied: but immediately on wetting, provided the grains of wheat have been newly gathered, the ſuppoſed fibres ſeparate, and appear to be living creatures. Their motions at firſt are very languid; but gradually become more active and vigorous, twiſting and wriggling themſelves ſomewhat in the manner of the eels in paſte, but always ſlower and with leſs regularity.

3. *The Proteus*, ſo called on account of its aſſuming a great number of different ſhapes, ſo as ſcarcely to be known as the ſame animal in its various transformations; and indeed, unleſs it be carefully watched while paſſing from one ſhape to another, it will often become ſuddenly inviſible. When water, wherein any ſort of vegetable has been infuſed, or animals preſerved, has ſtood quietly for ſome days or weeks in any glaſs or other veſſel, a ſlimy ſubſtance will be collected about the ſides: ſome of which being taken up with the point of a pen-knife, placed on a ſlip of glaſs in a drop of water, and looked at through the microſcope, will be found to harbour ſeveral kinds of little animals that are ſeldom found ſwimming about at large; among which the proteus is one. Its ſhape is better underſtood from the following plate, than from any deſcription that could be given. Its ſubſtance and colour reſemble that of a ſnail; and its whole ſhape ſeems to bear a conſiderable reſemblance to that of a ſwan. It ſwims to and fro with great vivacity: but will now and then ſtop for a minute or two; during which time its long neck is uſually employed as far as it can reach, forwards, and on every ſide, with a ſomewhat-ſlow but equable motion, like that of a ſnake, frequently extending thrice the length of its body, and ſeemingly in ſearch of food. There are no eyes, nor any opening in the head like a mouth, to be diſcerned: but its actions plainly prove it to be an animal that can ſee; for, though multitudes of different animalcules ſwim about in the ſame water, and its own progreſſive motion is very ſwift, it never ſtrikes againſt any of them, but directs its courſe between them with a dexterity wholly unaccountable ſhould we ſuppoſe it deſtitute of ſight. When it is alarmed, it ſuddenly draws in its neck, repreſented in the Plate at fig. 4 and 5. transforming itſelf into the ſhape repreſented at fig. 6. when it becomes more opaque, and moves about very ſlowly, with the large and foremoſt. When it has continued ſome time in this poſture, it will often, inſtead of the head and neck it had formerly, put forth a new one, with a kind of wheel-machinery, repreſented



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Animalcules.

repreſented at fig. 7. the motions of which draw a current of water to it from a conſiderable diſtance. Having often pulled in and thruſt out this ſhort head, ſometimes with and ſometimes without the wheel-work, the creature, as if weary, will remain motionleſs for a while; then its head and long neck will be very ſlowly protruded, as at fig. 8. and it ſoon reſumes its former agility. Sometimes it diſpoſes of its neck and head as repreſented at fig. 9.

4. *The Wheel-animal*, or *Vorticella*. This wonderful animalcule is found in rain-water that has ſtood ſome days in leaden gutters, or in hollows of lead on the tops of houſes, or in the ſlime or ſediment left by ſuch water; and perhaps may alſo be found in other places; but, if the water ſtanding in gutters of lead, or the ſediment left behind it, has any thing of a red colour in it, one may be almoſt certain of finding them therein. Though it diſcovers no ſigns of life except when in the water, yet it is capable of continuing alive for many months after it is taken out of the water, and kept in a ſtate as dry as duſt. In this ſtate it is of a gobular ſhape, exceeds not the bigneſs of a grain of ſand, and no ſigns of life appear; but, being put into water, in the ſpace of half an hour a languid motion begins, the globule turns itſelf about, lengthens itſelf by ſlow degrees, aſſumes the form of a lively maggot, and moſt commonly in a few minutes afterwards puts out its wheels; ſwimming vigorouſly through the water, as if in ſearch of food; or elſe, fixing itſelf by the tail, works the wheels in ſuch a manner as to bring its food to it. Fig. 10, 11, 12, and 13, ſhow the different appearances of its wheels; and fig. 14, and 15, ſhow its globular form. The moſt remarkable part of this animalcule is its wheel-work. This conſiſts of a couple of ſemicircular inſtruments, round the edges of which many little fibrillæ move themſelves very briſkly, ſometimes with a kind of rotation, and ſometimes in a trembling or vibrating manner. When in this ſtate, it ſometimes unfaſtens its tail, and ſwims along with a great deal of ſwiftneſs, ſeemingly in purſuit of its prey. Sometimes the wheels ſeem to be entire circles, armed with ſmall teeth, like thoſe of the balance-wheel of a watch, appearing projected forwards beyond the head, and extending ſideways ſomewhat wider than its diameter. The teeth or cogs of theſe wheels ſeem to ſtand very regularly at equal diſtances; but the figure of them varies according to their poſition, the degree of their protruſion, and perhaps the will of the animal itſelf. All the actions of this creature ſeem to imply ſagacity and quickneſs of ſenſation. At the leaſt touch or motion in the water, they inſtantly draw in their wheels; and their eyes ſeem to be lodged ſomewhere about the wheels; becauſe, while in the maggot ſtate, its motions are ſlow and blundering; but, after the wheels are protruded, they are performed with great regularity, ſwiftneſs, and ſteadineſs.

Beſides the above, there are found in our waters ſeveral other ſpecies of animals furniſhed with wheels, ſome of which appear to have a rotatory, and others a vibratory, motion. Fig. 16. repreſents a kind found in the ditch at Norwich, where the hair-like inſect is produced. They differ from the foregoing only in having very long tails. Fig. 17, 18, and 19, repreſent a ſpecies of wheel-animals, which are alſo covered with ſhells. The body of this ſpecies conſiſts of three parts, in like manner as the other; only the thorax and abdomen, in this, are not ſeparated by any gut, or intermediate veſſel, but are joined immediately together. The heart is plainly perceived, having a regular ſyſtole and diaſtole, at *aaa*, as in the former ſpecies. Theſe creatures occaſionally draw themſelves entirely within their ſhells; and the ſhell then appears terminated by ſix ſhort ſpikes on one ſide and two on the other. The young ones of this ſpecies are carried in oval ſacculi, or integuments, faſtened externally to the lower part of their ſhells ſomewhere about the tail. When a young one is about to burſt its integuments, the parent aſſiſts it greatly, by wagging its tail, and ſtriking the oval bag, ſo that the young one's head becomes as it were forced into the water, though the tail cannot be ſo ſoon diſengaged. In this condition the young one ſets its wheel a-going, and exerts all its endeavours to free itſelf from its confinement. When it has got clear, it ſwims away, wagging its tail as the old one does, and leaving the integument adhering to the ſhell of the parent. Theſe wheel-animals are great tormentors of the water-flea, of which a figure is given in the plate. Fig. 20. ſhows it magnified, with ſome of the wheel-animals adhering to it; fig. 21. ſhows the natural ſize of the flea. Theſe inſects are often found in great numbers in the ſame water; and, when that is the caſe, it is not uncommon to diſcover five or ſix of theſe cruſtaceous wheel-animals faſtened by their tail to the ſhell or horns of the flea: cauſing it, ſeemingly, a vaſt deal of uneaſineſs; nor can they be driven away, or ſhaken off, by all the efforts the flea can uſe for that purpoſe.

5. *The Bell-flower Animal, or Plumed Polype.* Theſe animalcules dwell in colonies together, from ten to fifteen, (ſeldom falling ſhort of the former number, or exceeding the latter,) in a ſlimy kind of mucilaginous or gelatinous caſe; which out of the water has no determined form, appearing like a little lump of ſlime; but, when expanded therein, has ſome reſemblance to the figure of a bell with its mouth upwards; and is uſually about half an inch long and a quarter of an inch in diameter. Theſe bells, or colonies, are to be found adhering to the large leaves of duckweed, and other aquatic plants. They may be moſt eaſily diſcovered by letting a quantity of water, with duckweed in it, ſtand quietly for three or four hours in glaſs veſſels in a window, or other place where a ſtrong light comes; for then, if

if any are about the duckweed, they will be found, on careful inſpection, extending themſelves out of their caſes, and making an elegant appearance. Beſides the particular and ſeparate motion which each of theſe creatures is able to exert within its own caſe, and independent of the reſt; the whole colony together has a power of altering the poſition of the bell, or even of removing it from one place to another; and hence this bell is ſometimes found ſtanding perfectly upright, as at fig. 22. and ſometimes bending the upper part downwards. As theſe animalcules ſeem not to chooſe to ſtay together in ſocieties whoſe number exceeds fifteen, when the colony happens to increaſe in number, the bell may be obſerved to ſplit gradually, beginning from about the middle of the upper or anterior extremity, and proceeding downwards towards the bottom, as at fig. 23. till they at laſt ſeparate entirely, and become two complete colonies independent of each other, one of which ſometimes removes to another part of the veſſel. The arms of each individual of this colony are ſet round the head, to the number of forty, having each the figure of an Italic *ſ*, one of whoſe hooked ends is faſtened to the head, and all together, when expanded, compoſe a figure ſhaped ſomewhat like a horſe's ſhoe, convex on one ſide next the body, but gradually opening and turning outwards, ſo as to leave a conſiderable area within the outer extremities of the arms. When the arms are thus extended, the creature, by giving them a vibrating motion, can produce a current in the water, which brings the animalcules, or whatever other minute bodies are within the ſphere of its action, with great velocity to its mouth, ſituated between the arms; where they are taken in if liked, or driven away by a contrary motion. Though their eyes cannot be diſcovered, yet they have perception of the light: for, when kept in the dark, they always remain contracted; but, on being expoſed to the light of the ſun or of a candle, they conſtantly extend their arms, and ſhow evident ſigns of being pleaſed.

6. *The Globe-animal.* This animalcule, repreſented at fig. 24. ſeems exactly globular, having no appearance of either head, tail, or fins. It moves in all directions, forwards or backwards, up or down, either rolling over and over like a bowl, ſpinning horizontally like a top, or gliding along ſmoothly without turning itſelf at all. Sometimes its motions are ſlow, at other times very ſwift; and, when it pleaſes, it can turn round, as it were upon an axis, very nimbly, without removing out of its place. The whole body is tranſparent, except where the circular black ſpots are ſhown in the figure. Some of the animals have no ſpots, and others from one to ſeven. The ſurface of the whole body appears, in ſome, as if all over dotted with points; in others, as if granulated like ſhagreen: but their more general appearance is, as if beſet thinly round with ſhort moveable hairs or briſtles, which probably

probably are the inſtruments by which their motions are performed. Theſe animalcules may be ſeen by the naked eye, but appear only like moving points.

7. *The Pipe-animal.* Theſe creatures are found on the coaſt of Norfolk, living in ſmall tubes or caſes of ſandy matter, in ſuch multitudes as to compoſe a maſs ſometimes of three feet in length. Fig. 25. ſhows a piece of ſuch a congeries broke off, where *aaaa* repreſent the mouths or openings of the pipes wherein the little animals make their abode. Fig. 26. ſhows one ſingle pipe, with its inhabitant, ſeparated from the reſt, and magnified nine or ten times in diameter. The pipe or caſe *b* is made of ſand, intermixed here and there with minute ſhells, and all cemented together by a glutinous ſlime, probably iſſuing from the animal's own body *c*, which is compoſed of muſcular ringlets like thoſe of a worm, capable of great extenſion or contraction. The anterior end or head, *d*, is exceedingly beautiful, having round it a double row of little arms diſpoſed in a very regular order, and probably capable of extenſion, in order to catch its food, aud bring it to its mouth. Some of theſe tubes are found petrified.

8. *An Inſect with net-like arms.* The properties and ſhape of this little animal are very extraordinary. It is found only in caſcades, where the water runs very ſwift. There theſe inſects are found in cluſters, ſtanding erect on their tails; and reſembling, when all together, the combs of bees at the time they are filled with their aureliæ. On being taken out of the water, they ſpin threads, by which they hang exactly in the ſame manner as the garden-ſpider. Fig. 27. ſhows one of theſe inſects magnified. Its body appears curiouſly turned as on a lathe; and at the tail are three ſharp ſpines, on which it raiſes itſelf, and ſtands upright in the water: but the moſt curious apparatus is about its head, where it is furniſhed with two inſtruments like fans or nets, which ſerve to provide its food. Theſe it frequently ſpreads out and draws in again; and when drawn up they are folded together with the utmoſt nicety and exactneſs, ſo as to be indiſcernible when brought cloſe to the body. At the bottom of theſe fans a couple of claws are faſtened to the lower part of the head, which, every time the nets are drawn in, conduct to the mouth of the animal whatever is taken in them. Some of theſe creatures being kept with water in a vial, moſt of them died in two days; and the reſt, having ſpun themſelves tranſparent caſes, (which were faſtened either to the ſides of the glaſs, or to pieces of graſs put into it,) ſeemed to be changed into a kind of chryſalis. None of them lived above three days; and, though freſh water was given them two or three times a-day, yet in a few hours it would ſtink to a degree ſcarcely conceivable, and that too at ſeveral yards diſtance, though, in proportion to the water, all the included inſects were not more than as one to one million one hundred and fifty thouſand.

ſand. This makes it probable, that it is neceſſary for them to live in a rapid ſtream, leſt they ſhould be poiſoned by the effluvia iſſuing from their own bodies, as no doubt they were in the phial.

9. *A curious aquatic worm.* This animalcule is ſhown, magnified, at fig. 28. It is found in ditch-water, and is of various ſizes, from one fortieth to half an inch in length. About the head it has ſomewhat of a yellowiſh colour; but all the reſt of the body is perfectly colourleſs and tranſparent, except the inteſtines, which are conſiderably opaque, and diſpoſed as in the figure. Along its ſides are ſeveral papillæ, with long hairs growing from them: it has two black eyes, and is very nimble. But the moſt remarkable thing in this creature, is a long horn or proboſcis; which, in the large ones, may be ſeen with the naked eye, if the water is clear, and is ſometimes one tenth of an inch in length; this it waves to and fro as it moves in the water, or creeps up the ſide of the glaſs; but it is not known whether it is hollow, or of what uſe it is to the creature itſelf.

10. *Spermatic Animals* and *Animalcula Infuſoria.* The diſcovery of living animalcules in the ſemen of moſt animals, is claimed by Leeuwenhoek, a Dutch naturaliſt. According to this naturaliſt, theſe animalcules are found in the male ſeed of every kind of animal; but their general appearance is very much the ſame, nor doth their ſize differ in proportion to the bulk of the animal to which they belong. The bodies of all of them ſeem to be of an oblong oval form, with long tapering ſlender tails iſſuing from them: and, as by this ſhape they reſemble tadpoles, they have been frequently called by that name; though the tails of them, in proportion to their bodies, are much longer than the tails of tadpoles are: and it is obſervable, that the animalcules in the ſeed of fiſhes have tails much longer and more ſlender than the tails of thoſe in other animals; inſomuch, that the extremity of them is not to be diſcerned without the beſt glaſſes, and the utmoſt attention. Fig. 29, *a*, *b*, *c*, *d*, repreſent the ſpermatic animalcula of the rabbit; and fig. 30, *e*, *f*, *g*, *h*, thoſe found in the ſeed of a dog. The numbers of theſe animalcula are inconceivable. On viewing with a microſcope the milt or ſeed of a male cod-fiſh, innumerable multitudes of animalcules are found therein, of ſuch a diminutive ſize, that at leaſt ten thouſand of them are capable of being contained in the bulk of a grain of ſand; whence it is concluded, that the milt of this ſingle fiſh contained more living animalcules than there are to be found people living in the whole world. To find the comparative ſize of theſe animalcules, Mr. Leeuwenhoek placed a hair of his head near them; which hair, through his microſcope, appeared an inch in breadth; and he was ſatisfied, that at leaſt ſixty ſuch animalcules could eaſily lie within that diameter; whence, their bodies being ſpherical, it follows, that two hundred and ſix-

teen thouſand of them are but equal to a globe whoſe diameter is the breadth of a hair. He obſerved, that, when the water wherewith he had diluted the ſeed of a cod-fiſh was exhaled, the little bodies of the animalcules burſt in pieces; which did not happen to thoſe in the ſeed of a ram: and this is imputed to the greater firmneſs and conſiſtency of the latter, as the fleſh of a land-animal is more compact than fiſh. Theſe animalcules appear to be very vigorous and tenacious of life; for they may be obſerved to move long after the animal from which they are taken is dead. They have this peculiarity alſo, that they are continually in motion, without the leaſt reſt or intermiſſion, provided there is fluid ſufficient for them to ſwim about in. Theſe animalcules are only peculiar to the ſeed; nothing that has the leaſt token of life being diſcoverable by the beſt glaſſes, either in the blood, ſpittle, urine, gall, or chyle. Great numbers, however, are to be found in the whitiſh matter that ſticks between our teeth; ſome of which are of an oval figure, and others reſemble eels.

The *Animalcula Infuſoria* take their name from their being found in all kinds either of vegetable or animal infuſions. Indeed, there is ſcarcely any kind of water, unleſs impregnated with ſome mineral ſubſtance, but what will diſcover living creatures. Leeuwenhoek ſays, that at firſt he could diſcern no living creatures in rain-water; but, after ſtanding ſome days, he diſcovered innumerable animalcules, many thouſands of times leſs than a grain of ſand, and in proportion to a mite as a bee is to a horſe. In other rain-water, which had likewiſe ſtood ſome time, he found the ſmalleſt ſort he had ever ſeen; and, in a few days more, met with others eight times as big as theſe, and almoſt round. In another quantity of rain-water, that had been expoſed like the former, he diſcovered a kind of animalcules with two little horns, in continual motion. The ſpace between the horns was flat, though the body was roundiſh, but tapering a little towards the end; where a tail appeared, four times as long as the body, and the thickneſs of a ſpider's web. He obſerved ſeveral hundreds of theſe within the ſpace a grain of ſand would occupy. If they happened on the leaſt filament or ſtring, they were entangled in it; and then would extend their bodies into an oblong round, and ſtruggle hard to diſengage their tails. He obſerved a ſecond ſort, of an oval figure, and imagined the head to ſtand at the ſharpeſt end. The body was flat, with ſeveral ſmall feet, moving exceeding quick, but not diſcernible without a great deal of attention. Sometimes they changed their ſhape into a perfect round, eſpecially when the water began to dry away. He met alſo with a third ſort, twice as long as broad, and eight times ſmaller than the firſt: yet in theſe he diſcerned little feet, whereby they moved very nimbly. He perceived likewiſe a fourth ſort, a thouſand times ſmaller than a louſe's eye, and which exceeded all the reſt in briſkneſs: he found theſe

turning

turning themſelves round, as it were upon a point, with the celerity of a top. And he ſays, there were ſeveral other ſorts. The production of *animalcula infuſoria* is very ſurpriſing. In four hours time, an infuſion of cantharides has produced animalcula leſs than even the tails of the ſpermatic animals we have already deſcribed. Neither do they ſeem to be ſubject to the fate of other animals; but, ſeveral kinds of them at leaſt, by dividing themſelves in two, to enjoy a ſort of immortality. Nor do the common methods by which other animals are deſtroyed, ſeem to be effectual for deſtroying their vital principle. Hot mutton-gravy, ſecured in a phial with a cork, and afterwards ſet among hot aſhes, to deſtroy as effectually as poſſible every living creature that could be ſuppoſed to exiſt in it, has nevertheleſs been found ſwarming with animalcules, after ſtanding a few days. In the Philoſophical Tranſactions, vol. lix. we have a very curious account, given us by Mr. Ellis, of animalcules produced from an infuſion of potatoes and of hemp-ſeed.

"On the 25th of May, 1768, Fahrenheit's thermometer ſeventy degrees, I boiled a potatoe in the New-River water, till it was reduced to a mealy conſiſtence. I put part of it, with an equal proportion of the boiling liquor, into a cylindrical glaſs veſſel, that held ſomething leſs than half a wine pint, and covered it cloſe immediately with a glaſs cover. At the ſame time I ſliced an unboiled potatoe, and, as near as I could judge, put the ſame quantity into a glaſs veſſel of the ſame kind; with the ſame proportion of New-River water not boiled; and covered it with a glaſs cover; and placed both veſſels cloſe to each other. On the twenty-ſixth of May, twenty-four hours afterwards, I examined a ſmall drop of each, by the firſt magnifier of Wilſon's microſcope, whoſe focal diſtance is reckoned at the fiftieth part of an inch; and, to my amazement, they were both full of animalcules of a linear ſhape, very diſtinguiſhable, moving to and fro with great celerity; ſo that there appeared to be more particles of animal than vegetable life in each drop. This experiment I have repeatedly tried, and always found it to ſucceed in proportion to the heat of the circumambient air; ſo that even in winter, if the liquors are kept properly warm, at leaſt in two or three days the experiment will ſucceed. What I have obſerved are infinitely ſmaller than ſpermatic animals, and of a very different ſhape: the truth of which every accurate obſerver will ſoon be convinced of, whoſe curioſity may lead him to compare them; and I am perſuaded he will find they are no way akin. At preſent I ſhall paſs over many other curious obſervations, which I have made on two years experiments, in order to proceed to the explaining a hint which I received laſt January from M. de Sauſſure, of Geneva, when he was here; which is, that he found one kind of theſe animalcula infuſoria that increaſe by dividing acroſs into nearly two equal parts. I had often ſeen this

appearance

appearance in various ſpecies a year or two ago, as I found upon looking over the minutes I had taken when I made any new obſervation; but always ſuppoſed the animal, when in this ſtate, to be in coition. Not hearing, till after M. de Sauſſure left this kingdom, from what infuſion he had made his obſervation, his friend Dr. de la Roche, of Geneva, informed me, the latter end of February laſt, that it was from hemp-ſeed. I immediately procured hemp-ſeed from different ſeedsmen, in diſtant parts of the town. Some of it I put into New-River water, ſome into diſtilled water, and ſome I put into very hard pump-water. The reſult was, that in proportion to the heat of the weather, or the warmth in which they were kept, there was an appearance of millions of minute animalcula in all the infuſions; and, ſome time after, ſome oval ones made their appearance. Theſe were much larger than the firſt, which ſtill continued; they wriggled to and fro in an undulatory motion, turning themſelves round very quick all the time that they moved forwards. Nothing more plainly ſhows theſe animals to be zoophytes than this circumſtance; that when, by accident, the extremity of their bodies has been ſhrivelled for want of a ſupply of freſh water, the applying more freſh water has given motion to the part of the animal that was ſtill alive; by which means, this ſhapeleſs figure has continued to live and ſwim to and fro all the time it was ſupplied with freſh water."—Thus we have given as full an account as our limits would admit, of the moſt curious kind of animalcules that have hitherto been obſerved. We cannot, however, diſmiſs this ſubject, without taking notice of the animalcules found in the ſeed of man.

Before the invention of microſcopes, the doctrine of equivocal generation, both with regard to animals and plants of ſome kinds, was univerſally received: but this inſtrument ſoon convinced every intelligent perſon, that thoſe plants which formerly were ſuppoſed to be produced by equivocal generation, aroſe from ſeeds; and the animals, in like manner, from a male and female. But, as the microſcope threw light upon one part of nature, it left another involved in darkneſs: for the origin of the animalcula infuſoria, or of the ſpermatic animals already mentioned, remains as much unknown, as that of many other kinds was, when the doctrine of equivocal generation reigned in full force.

The diſcovery of ſpermatic animalcules was thought to throw ſome light on the myſterious affair of generation itſelf, and theſe minute creatures were imagined to be each of them individuals of the ſame ſpecies with the parent. Here the infinite number of theſe animalcules was an objection, and the difficulty remained as great as before; for, as every one of theſe animalcules behoved to be produced from a male and female, to explain their origin by animalcular generation in the ſame manner,

manner, was only explaining generation by itſelf. This hypotheſis, therefore, having proved unſatisfactory, others have been invented, but which are likewiſe involved in doubt. M. Buffon, however, ſo far as concerns human generation, has given ſuch a particular account of the animalcules in the ſeed of man, that we ſhall ſtate it here, for the information of the curious.

Having procured the private parts of a man who died a violent death, he extracted all the ſeed from them while they were ſtill warm: and having examined a drop of it with a double microſcope, it had the appearance as in the Plate, at fig. 31. Large filaments appeared, which in ſome places ſpread out into branches, and in others intermingled with one another. Theſe filaments clearly appeared to be agitated by an internal undulatory motion, like hollow tubes which contained ſome moving ſubſtance. He ſaw diſtinctly this appearance changed for that at fig. 32. Two of theſe filaments, which were joined longitudinally, gradually ſeparated from each other in the middle, alternately approaching and receding, like two tenſe cords fixed by the ends, and drawn aſunder in the middle. Theſe filaments were compoſed of globules that touched one another, and reſembled a chaplet of beads. After this, he obſerved the filaments ſwelled in ſeveral places, and perceived ſmall globular bodies iſſue from the ſwelled parts, which had a vibratory motion like a pendulum. Theſe ſmall bodies were attached to the filaments by ſmall threads, which gradually lengthened as the bodies moved. At laſt, the ſmall bodies detached themſelves entirely from the filaments, drawing after them the ſmall thread, which looked like a tail. When a drop of the ſeminal liquor was diluted, theſe ſmall bodies moved in all directions very briſkly. The ſeminal matter was at firſt too thick, but gradually became more fluid; and, in proportion as its fluidity increaſed, the filaments diſappeared, but the ſmall bodies became exceedingly numerous. Each of them had a long thread or tail attached to it, from which it evidently endeavoured to get free. Their progreſſive motion was extremely ſlow, during which they vibrated to the right and left; and at each vibration they had a rolling unſteady motion in a vertical direction.

At the end of two or three hours, the ſeminal matter becoming ſtill more fluid, a greater number of theſe moving bodies appeared. They were then more free of incumbrances; their tails were ſhorter; their progreſſive motion was more direct, and their horizontal motion greatly diminiſhed. In five or ſix hours, the ſeed had acquired almoſt all the fluidity it could acquire without being decompoſed. Moſt of the ſmall bodies were now diſengaged from their threads: their figure was oval; they moved forward with conſiderable quickneſs, and, by their irregular motions backward and forward, they had now more than ever the appearance of animals.

Thoſe that had tails adhering to them, ſeemed to have leſs vivacity than the others: and of thoſe that had no tails, ſome altered both their figure and their ſize. In twelve hours, the ſeed had depoſited at the bottom of the vial a kind of aſh-coloured gelatinous ſubſtance, and the fluid at top was almoſt as tranſparent as water. The little bodies, being now entirely freed from their threads, moved with great agility, and ſome of them turned round their centres. They alſo often changed their figures, from oval becoming round, and often breaking into ſmaller ones. Their activity always increaſed as their ſize diminiſhed. In twenty-four hours the ſeed had depoſited a greater quantity of gelatinous matter, which, being with ſome difficulty diluted in water, exhibited an appearance ſomewhat reſembling lace. In the clear ſeed itſelf, only a few ſmall bodies were now ſeen moving; next day, theſe were ſtill farther diminiſhed; and after this nothing was to be ſeen but globules, without the leaſt appearance of motion. All the above-mentioned appearances in the ſeed of man, are ſhown in the Plate, at fig. 33, 34, 35, 36, 37, and 38. Fig. 39 and 40 repreſent an appearance of the globules in another experiment, in which they arranged themſelves in troops, and paſſed very quickly over the field of the microſcope: in this experiment they were found to proceed from a ſmall quantity of gelatinous mucilage, depoſited by the ſeed.

An objection has, however, been made to the exiſtence of animalcules in the ſeed, or in any other part of animal bodies, from the total excluſion of air, which is found ſo neceſſary to the life of larger animals. Many inſtances, however, have been obſerved of large animals being found in ſuch ſituations as they could not poſſibly have enjoyed the leaſt benefit from the air for a great number of years; and in this ſtate have not only lived, but lived much longer than they would otherwiſe have done.

In Toulon harbour, and the road, are found ſolid hard ſtones, and perfectly entire, containing, in different cells, ſecluded from all communication with the air, ſeveral living ſhell-fiſh, of an exquiſite taſte, called *dactyli*. To come at theſe fiſh, the ſtones are broken with mauls. Alſo, along the coaſt of Anconia, in the Adriatic, are ſtones uſually weighing about fifty pounds, and ſometimes even more; the outſide rugged, and eaſily broken, but the inſide ſo hard as to require a ſtrong arm and an iron maul to break them; within them, and in ſeparate niches, are found ſmall ſhell-fiſh, quite alive, and very palatable, called *ſolenes*, or *cappe lunghe*. Theſe facts are atteſted by Gaſſendi, Blondel, Mayol, the learned biſhop of Sulturara; and more particularly by Aldrovandus, a phyſician of Bologna. The two latter ſpeak of it as a common fact which they themſelves ſaw.

In the volume for the year 1719, of the Memoirs of the Academy of Sciences at Paris, is the following paſſage: "In the foot of an elm, of the bigneſs of a pretty corpulent

corpulent man, three or four feet above the root, and exactly in the centre, has been found a live toad, middle-ſized, but lean, and filling up the whole vacant ſpace: no ſooner was a paſſage opened by ſplitting the wood, that it ſcuttled away very haſtily: a more firm and ſound elm never grew; ſo that the toad cannot be ſuppoſed to have got into it. The egg or ſpawn whence it was formed, muſt, by ſome very ſingular accident, have been lodged in the tree at its firſt growth. There the creature had lived without air, feeding on the ſubſtance of the tree, and growing only as the tree grew. This is atteſted by Mr. Hubert, profeſſor of philoſophy at Caen."

The volume for the year 1731 has a ſimilar obſervation, expreſſed in theſe words: —"In 1719, we gave an account of a fact, which, though improbable, was well atteſted; that a toad had been found living and growing in the trunk of a middling elm, without any way for the creature to come out or to have got in. M. Seigne, of Nantes, lays before the academy a fact juſt of the very ſame nature, except that inſtead of an elm it was an oak, and larger than the elm, which ſtill heightens the wonder. He judges, by the time requiſite for the growth of the oak, that the toad muſt have ſubſiſted in it, without air or any adventitious aliment, during eighty or one hundred years. M. Seigne ſeems to have known nothing of the fact in 1719."

With the two foregoing may be claſſed a narrative of Ambroſe Paré, chief ſurgeon to Henry III. king of France, who, being a very ſenſible writer, relates the following fact, of which he was an eye-witneſs:—"Being (ſays he) at my ſeat, near the village of Meudon, and overlooking a quarry-man whom I had ſet to break ſome very large and hard ſtones; in the middle of one we found a huge toad, full of life, and without any viſible aperture by which it could get there. I began to wonder how it received birth, had grown and lived: but the labourer told me, it was not the firſt time he had met with a toad, and the like creatures, within huge blocks of ſtone, having no viſible opening or fiſſure."

Obſervations of living toads, found in very hard and entire ſtones, occur in ſeveral authors, particularly Baptiſt Fulgoſa, doge of Genoa, the famous phyſicians Agricola and Horſtius, and Lord Verulam; others give very ſpecious accounts of ſnakes, frogs, crabs, and lobſters, being found alive, incloſed within blocks of marble, rocks, and large ſtones.

An inſtance ſimilar to theſe, of the truth of which we have no reaſon to doubt, was obſerved in this country in the year 1773, where a large toad was found in the middle of a piece of coal, having not the leaſt viſible crack or fiſſure.

Thus much as to the faculty of ſome animals to live without air.

Upon the whole, though philoſophers are not yet able to diſcover how very minute creatures are produced; yet, that there really are animals much ſmaller than what

what we can diſcern with our naked eye, ſeems to be indiſputable. And the ſubject evidently requires the utmoſt attention of philoſophers, as well as further improvements in the conſtruction of microſcopes, fully to inveſtigate and explain it. —Moſt naturaliſts ſuppoſe another ſpecies or order of inviſible animalcules, ſuch as eſcape the cognizance even of the beſt microſcopes, and give many probable conjectures in relation to them. Reaſon and analogy give ſome ſupport to the exiſtence of infinite imperceptible animalcules. The naked eye takes in from the elephant to the mite; but there commences a new order, reſerved only for the microſcope, which comprehends all thoſe from the mite to thoſe twenty-ſeven millions of times ſmaller; and this order cannot be yet ſaid to be exhauſted, if the microſcope be not arrived at its laſt and higheſt perfection.

Animalcules are the cauſe of various diſorders. The itch, from ſeveral experiments, is a diſorder ariſing from the irritations of a ſpecies of inſect found in the puſtules of that diſorder, (the Acarus exulcerans;) whence the communication of it by contact from one to another is eaſily conceived; as alſo the reaſon of the cure being effected by external applications. Many other cutaneous eruptions, often ſuppoſed to originate in the blood, are nothing more than ſettlements made by colonies of theſe inviſible beings. A ſwarm of them light upon the ſkin, and, finding in its pores a comfortable habitation, ſoon produce a puncture, with ſcabs and irritation. But this is not the worſt. Obſervation has long convinced me that a variety of internal complaints in the ſtomach, pancreas, lungs, liver, and inteſtines, are brought on by ſwallowing myriads of theſe, and other imperceptible living creatures, which inhabit raw vegetables and foul water; and, finding the heat and food of the ſtomach congenial to their growth, they become a new ſpecies, of an alarming ſize, and prey upon the vital parts, to the great detriment of the patient's health, and oftentimes at the expenſe of his life, before the malady can be known, or even ſuſpected.

A patient of mine, a young man near eighteen years of age, had been a conſiderable time in a conſumptive habit, and diſordered in the ſtomach; and notwithſtanding he had the advice of ſeveral eminent phyſicians, and had taken a variety of medicines, he never found the ſmalleſt alleviation of his pain. Upon enquiring into the nature of his food for ſome time before, he told me he came from a village near Bridport, in Dorſetſhire, which abounds with water-creſſes, and on theſe he had fed almoſt daily for ſome months previous to his coming to London. I gave him three emetics ſucceſſively, with a view to cleanſe the ſtomach from all ſlime, phlegm, and undigeſted food; and immediately after the laſt had operated, he took a ſtrong doſe, undiluted, of my Solar Tincture. In leſs than ten minutes it brought up an animal of the moſt hideous form, which at firſt appeared incapable of motion, being

ing overcome by the ſtrength of the medicine; but, on putting it into a baſon of warm water, it quickly recovered, and ſent forth a ſet of tentacles or claws, which, though greatly enlarged, and diverſely altered, ſoon convinced me it muſt originally have been a ſhoot from the freſh-water polypus; that, on leaving the parent animal, it had attached itſelf to a root or leaf of the water-creſſes which this young man unfortunately ſwallowed. And it appeared further, that theſe tentacles or claws had been ſo ſtrongly affixed to the bowels or coats of the ſtomach, as to have defied the power of all common remedies to remove them. The patient happily found immediate relief, and is now healthy and robuſt.

From ſeveral other patients, apparently in conſumptions, or afflicted with nauſea, or uncommon ſenſations in the ſtomach and bowels, I have brought away living animals that would terrify many people to look upon; and which muſt have come from the ſpawn, or eggs, of minute animals, taken in with the food. For this reaſon I would admoniſh all my readers to have the utmoſt care taken in the waſhing and cleanſing of ſallads, water-creſſes, and all raw vegetables; and particularly to guard againſt the long red worm which almoſt continually lies concealed in the very heart or centre of a head of celery. The ſame caution is neceſſary in eating all kinds of fruit; ſince nothing much more abounds with animalcules, and various living creatures. Cold raw water, particularly when ſtagnant, ought never to be drunk. It is ever the ſafeſt way to boil your water, before it be uſed in the compoſition of any kind of beverage, or even to drink alone.

I might here adduce many other inſtances of perſons having engendered living creatures in their bowels, by ſwallowing the eggs or ſpawn of the parent animal. A young man, ſervant to Lord Stawell, at Holt-park near Farnham, Surry, had eaten voraciouſly of water-creſſes. Some time afterwards he went into a decline, and complained of a continual ſenſation of pain at the pit of his ſtomach, which no medicine could remove. His lordſhip, having a value for the man, ſent him to town for the advice of the moſt able phyſicians; but ſtill to no purpoſe. He was in this ſtate ſent home to his friends, and given over as a loſt and incurable caſe. In this ſtage ſome ſtrong emetics were given him by a country apothecary; and he threw up, to the amazement of all the country round, an incredible number of ſmall tadpoles, which were evidently the production of ſpawn attached to the water-creſſes, eaten without care, and perhaps without waſhing. The patient recovered rapidly, and in leſs than a month was able to reſume his former avocation.

But a ſtill more extraordinary caſe happened in the county of Hants, in the year 1792, of a girl about fourteen years of age, who found a moſt uncommon ſenſation in her ſtomach and bowels; and could plainly feel and diſtinguiſh ſome-

thing alive, and moving within her. The girl's deſcription was for ſome time treated as a chimera. At laſt, however, ſhe brought up a living toad! This unqueſtionably muſt have been taken into her ſtomach in that ſtate of the ſpawn which is juſt emerging to tadpoles, and was attributed to her eating water-creſſes, which had long been a common food with her. Nothing could have ſaved her from poiſon, but the creature having been bred and nouriſhed up as it were in her own body, and had aſſimilated ſo much with the nature thereof as to have thus long proved harmleſs. It is however certain, that, had it not been thus timely brought away, ſhe muſt very ſoon have died.

Animalcules are the moſt common cauſes of foul and rotten teeth. They attack the roots below the enamel, which they perforate, and in a ſhort time form cruſtations or ſcales round the teeth, as hard as ſtones; but which are nothing more than a congeries or cruſtaceous ſhell, which theſe little animals inhabit, and are probably formed of the fine particles falling from the teeth during their perforations, cemented together by a glutinous ſlimy matter iſſuing from their own bodies, which are compoſed of ringlets like a worm. Hence too we diſcover the true cauſe of fœtid or ſtinking breath; for, when theſe little eels have made their way to the marrow, or internal part, of the tooth, the whole crown ſoon becomes rotten, and the marrow ſends forth a putrid effluvia, ſomewhat ſimilar, but much more offenſive, than the animalcules in ſtinking cheeſe. Theſe circumſtances ſeem to be but little known to the generality of dentiſts and operators on the teeth; otherwiſe I am perſuaded their mode of practice would be widely different. Inſtead of applying powders and dentifrices calculated to deſtroy theſe little worms, they prepare ſuch as multiply and nouriſh them; of which any perſon may be convinced, who will take the pains to make a few ſimple experiments. Let the roots of the teeth be ſcraped, and the matter collected from them put into a few drops of any dentifrice or tooth-tincture, particularly of the aromatic kind. If viewed with a microſcope, it will be ſeen that the animalcules or eels found in this matter will move about with great celerity, as if delighted with the liquor; and, in proportion as it evaporates or dries away, the animals appear diſſatisfied and become very uneaſy.

Happening to have a patient who had a very bad ſet of teeth, he ſuffered me to make ſome experiments upon them. I took off a few of the ſcales, and emerged them in a ſmall quantity of ſpring water. It was quickly filled with the little eels or animalcules; but imparted no ill ſmell. I examined the ſcales with the microſcope, and found them full of pores, out of which theſe inviſible animals were iſſuing. I then took out as much of the foul matter from the cavities of his hollow teeth as I could conveniently get at; and, the moment I put it in the water, it became fœtid, and ſent forth an offenſive ſmell. Viewing it with the microſcope, the animals

animals appeared in the ſame ſhape as the former, but quite opaque, and the inteſtinal canal much fuller, and more diſtended. I poured into the water a few drops of my Solar Tincture, and in leſs than five minutes all motion ceaſed, and they were quite dead. This induced me to perſuade the man to waſh his teeth and gums well with the Solar Tincture. He did ſo; and I then took off more of the ſcales, and collected all the matter I could from the rotten teeth; but very few living animalcules could be found therein, and the fœtid ſmell was conſiderably abated. He continued to waſh his mouth with the Tincture every other day for a week, and then uſed the following preparation: Chalk finely powdered, burnt hartſhorn levigated, Florentine orris-root, and myrrh, of each two drams; ſpirit of ſalt, ſix drops; the whole mixed into a fine powder. With this he rubbed his teeth every third day, with a ſoft bruſh, and in leſs than three weeks his black ſet of teeth became beautifully white; his breath ſweet; and his gums hard and firm; and he has ever ſince continued them ſo by the ſimple means above deſcribed. I am no dentiſt; what I have ſtated was matter of mere accident: but I would caution all my readers againſt too free a uſe of thoſe numerous powders and preparations continually recommended for the teeth. Inſtead of preſerving them, they have too often the direct contrary tendency, by deſtroying the whole ſet. The world however is fond of tooth-powders; and a moderate uſe of ſome of them may be of ſervice; but the daily rubbing does more injury to the teeth than wholly neglecting them. Fine levigated powders may be prudently uſed once in ſix or ſeven days, to keep the teeth white and ſplendid. But the generality of powders prepared for this purpoſe are much too hard, and wear away the gums, as well as the enamel of the teeth. Yet, notwithſtanding the danger of theſe preparations, it is a very deſirable thing to be enabled to preſerve the beauty and ſoundneſs of the teeth, from infancy to old age. For this purpoſe I would adviſe, that children ſhould be accuſtomed to waſh their teeth every morning with common water, and a ſoft tooth-bruſh; and after meals to rince the mouth, and rub the teeth with their fingers, where a bruſh cannot conveniently be uſed. Thoſe who conſtantly purſue this method, may expect to be free from rotten teeth, putrid ſlough, external diſcolourations, flaccid gums, and pain and looſeneſs of the teeth, ariſing from the animalcules which prey upon them. When teeth have been neglected for a time, and ſcales and cruſtations are affixed to them, theſe ſhould be removed by inſtruments, and the teeth and gums well waſhed with a powerful inſinuating tincture, to kill the animalcules; then the teeth ſhould be rubbed with a fine teſtaceous powder, in order to remove the diſcolouration. When the enamel is become perfectly clean, white, and poliſhed, even this fine powder ſhould be uſed very ſparingly, and at diſtant intervals. The colour

and

and ſweetneſs are only to be preſerved by frequent bruſhing and waſhing. The common trick of dentiſts is to give a waſh that inſtantly cleanſes and whitens the teeth, the ſudden effects of which are apt to ſurpriſe and pleaſe people; but their conſequences are very pernicious. All the acid ſpirits will do this; but they deſtroy the enamel, and rot the teeth. The ſafeſt liquid to take off black, green, and yellow, diſcolorations, is the following: Take plantane water, an ounce; honey of roſes, two drams; ſpirit of ſalt, ten drops: mix the whole together, and rub the teeth well with a linen rag dipped in the mixture, every day till they are perfectly white. If the roots of the teeth are very foul, inclined to grow rotten, and ſurrounded with ſcales and cruſtations, I ſhould by all means recommend them to be well waſhed with the Solar Tincture, which will ſtop them from further decay, entirely remove the ſcurvy from the gums, and perfectly ſweeten the breath.

The form, diſpoſition, and order, of the teeth, are admirable; and furniſh us with a noble inſtance of the wiſdom and goodneſs of the Creator; the foremoſt are weak, and far from the centre, as being only preparers to the reſt; the others, being to grind and maſticate, are accordingly ſtronger, and placed near the centre of motion. Their peculiar hardneſs is very remarkable, conſidering the tender ſubſtance they are formed of. Again, their various forms, in various creatures, are no leſs conſiderable, being all curiouſly adapted to the peculiar food and occaſions of the different ſpecies of animals. Thus in the rapacious, they are fitted for the catching, holding, and tearing, the prey; in herbaceous, for the gathering and comminution of vegetables; and in ſuch as have no teeth, as birds, the bill ſupplies the defect. Add to this, that the temporary defect of them is no leſs obſervable in ſome: that children, for inſtance, ſhould have none while they are not able to uſe them, but to hurt themſelves or the mother; and that, at the very age when they can take in the more ſubſtantial food, and live without the breaſt, and begin to need teeth for the help of ſpeech, that then their teeth ſhould begin to appear, and gradually grow, as they more and more ſtand in need of them; and that, when this firſt crop are worn out or decayed, they ſhould be ſucceeded by a new ſet, more firm and durable than the former. Nature, indeed, ſometimes deviates from the ordinary rule; according to the conſtruction of the elementary influx then operating, as is ſhown at large in my Illuſtration of the Occult Sciences; whence we have inſtances of perſons born with all their teeth, as Marcus Curius Dentatus and Cneius Papirius Carbo: others have only had one continued tooth, reaching the whole length of the jaw, as Pyrrhus king of Epirus, and Pruſias ſon of the king of Bithynia. A German phyſician, named Mentrelius, aſſures us, that he ſaw an old man at Cleves, in 1666, aged a hundred and twenty years, who had a new ſet of teeth only two years

years before, which were cut with great pain; and he alſo ſaw an Engliſhman at the Hague, who cut a new ſet of teeth in his hundred and eighteenth year. To the ſame purpoſe Dr. Slare mentions a relation, who had all his teeth at eighty years of age, and afterwards ſhed them, and had a new ſet all round. See Phil. Tranſ. Abr. vol. v. p. 353.

Of INSTINCT.

INSTINCT is an occult power or diſpoſition of the mind, by which animals are unerringly directed to do ſpontaneouſly whatever is neceſſary for the preſervation of the individual, or the continuation of the ſpecies. From this cauſe, all the actions of brutes, or inferior animals, are ſaid to be directed by *inſtinct*; but thoſe of man by *reaſon*. Philoſophers, however, have greatly differed in their opinions concerning this ſubject; and modern authors are extremely at a loſs where to draw the line. Some maintain that man is endowed with a greater number of inſtincts than any ſpecies of brutes whatever. Others inſiſt, that in human nature there is not any power or propenſity at all, which can properly be called inſtinctive. Some contend that brutes are guided wholly by an invariable inſtinct, without the ſmalleſt power of memory, or of any intellectual faculty; whilſt others inſiſt, that they poſſeſs a vegetative ſoul, directed by a certain inſtinct, capable of reaſon, of memory, and of experience.

With reſpect to man, nothing can be more apparent, than that, as being the microcoſm, or epitome of all created nature, he muſt of neceſſity partake of all its eſſential properties; of which *reaſon* and *inſtinct* rank amongſt the foremoſt.

Upon the ſlighteſt reflection, it will be obvious to every reader, that *reaſon* can never be exerciſed but from experience; conſequently, until man is arrived to a certain degree of maturity, he muſt be directed, in moſt of the propenſities of nature, by mere inſtinct. Thus an infant, a few moments after its birth, is directed by an inſtinctive impulſe for its preſervation, to ſeek the breaſt, and to ſuck it; and to the ſame cauſe, in the earlier ſtages of life, and in all ſavage uneducated countries, are to be attributed the firſt ſenſations or deſires of copulation, not from the pleaſures of enjoyment, for they are then unknown; but from an impulſive inſtinct, for the propagation of the ſpecies. It has been inſiſted, that the firſt commerce of the ſexes amongſt human beings is directed by reaſon; and the arguments aſſigned for it are theſe; that, as ſoon as the organs of generation in either ſex become ſufficiently ripe for the purpoſe intended by nature, they ſympathiſe with the ſenſes, and are affected with vibrations in the nerves, which riſe into pleaſure above the power of controul, and are heightened by youth, health,

grateful aliment, imagination, ambition, ſympathy, and various other involuntary ſenſations, which, under ſuch circumſtances, pervade the whole ſyſtem. And as theſe organs are endued with a greater degree of ſenſibility than the other parts, both from their make, and the peculiar ſtructure and diſpoſition of their nerves; from the great diſtention of the muſcular ſyſtem and ſeed-veſſels in males; as well as from the extenſion of the clitoris and ſinuſes of the uterus in females, which never fail to take place about the time of puberty, the genital organs in both ſexes become ſo extremely irritable, that *reaſon*, being thereby *awakened*, directs and impels to that act, by which alone the human ſpecies can poſſibly be continued, and the works of an Omnipotent Creator carried on and conducted to the ends intended.

In the above ſtatement, I am perſuaded every rational mind will agree, that the word *inſtinct* ought to have been ſubſtituted where that of *reaſon* is uſed; becauſe in civilized ſocieties we are taught by *reaſon* to overcome thoſe inſtinctive paſſions, inſtead of having our reaſon *awakened* by them; but we too often find that theſe inſtinctive paſſions are proof againſt both reaſon and reſolution, even in the moſt virtuous families, in all countries, and in the beſt-regulated ſocieties. What ſhall we ſay then of that part of the human race which yet remains in a ſtate of nature, uncultivated, and unenlightened by any precepts of morality or ſcience? They are ſubject to the primary command, "*Increaſe and multiply;*" and they obey it. A couple of young ſavages go together *for the firſt time*, without any view to offſpring, without any knowledge of the pleaſure to be derived from it, and without any determinate idea at all; and, as we ſee theſe means invariably purſued by all animals, as well rational as irrational, without experience, and without inſtruction, we muſt refer the mutual deſire of the ſexes to a much higher principle than can poſſibly ariſe from human motives; and that principle can be nothing but inſtinct. But as I ſhall have occaſion to ſpeak more at large on this ſubject under the article LOVE, when I come to treat of the affections and paſſions of the mind, and of the nature and perfections of Man, I ſhall in the interim proceed to ſhow, that the inferior animals are directed by inſtinct to performances of the moſt ſurpriſing kind; and are, within certain limits, endued with memory, and a reaſoning intellect.

The moſt remarkable inſtance of the power of inſtinct is obſerved in the conſtruction of a honey-comb. Bees, it is well known, conſtruct their combs with ſmall cells on both ſides, fit both for holding their ſtore of honey, and for rearing their young. There are only three poſſible figures of the cells, which can make them all equal and ſimilar, without any uſeleſs interſtices. Theſe are the equilateral triangle, the ſquare, and the regular hexagon. Of the three, the hexagon is the moſt

moſt proper, both for convenience and ſtrength. Bees, as if they knew this, make their cells regular hexagons. As the combs have cells on both ſides, the cells may either be exactly oppoſite, having partition againſt partition, or the bottom of a cell may reſt upon the partitions between the cells on the other ſide, which will ſerve as a buttreſs to ſtrengthen it. The laſt way is the beſt for ſtrength; accordingly the bottom of each cell reſts againſt the point where three partitions meet on the other ſide, which gives it all the ſtrength poſſible. The bottom of a cell may either be one plane, perpendicular to the ſide-partitions; or it may be compoſed of ſeveral planes, meeting in a ſolid angle in the middle point. It is only in one of theſe two ways that all the cells can be ſimilar without loſing room. And for the ſame intention, the planes, of which the bottom is compoſed, if there be more than one, muſt be three in number, and neither more nor fewer. It has been demonſtrated, that, by making the bottoms of the cells to conſiſt of three planes meeting in a point, there is a ſaving of material and labour no-way inconſiderable. The bees, as if acquainted with theſe principles of ſolid geometry, follow them moſt accurately; the bottom of each cell being compoſed of three planes, which make obtuſe angles with the ſide partitions and with one another, and meet in a point in the middle of the bottom; the three angles of this bottom being ſupported by three partitions on the other ſide of the comb, and the point of it by the common interſection of theſe three partitions. One inſtance more of the mathematical ſkill diſplayed in the ſtructure of a honey-comb deſerves to be mentioned. It is a curious mathematical problem, at what preciſe angle the three planes which compoſe the bottom of a cell ought to meet, in order to make the greateſt poſſible ſaving of material and labour. This is one of thoſe problems belonging to the higher parts of the mathematics, which are called problems of maxima and minima. The celebrated Maclaurin reſolved it by a fluxionary calculation, which is to be found in the Tranſactions of the Royal Society of London, and determined preciſely the angle required. Upon the moſt exact menſuration which the ſubject could admit, he afterwards found, that it is the very angle in which the three planes in the bottom of the cell of a honey-comb do actually meet. If a honey-comb were a work of human art, every man of common ſenſe would conclude, without heſitation, that he who invented the conſtruction muſt have underſtood the principles on which it was conſtructed. We need not ſay that bees know none of theſe things. They work moſt geometrically without any knowledge of geometry; ſomewhat like a child, who by turning the handle of an organ makes good muſic without any knowledge of muſic. The art is not in the child, but in him who made the organ. In like manner, when a bee makes its comb ſo geometrically,

cally, the geometry is not in the bee, but in that great Geometrician who made the bee, and made all things in number, weight, and meaſure. This places in a moſt ſtriking point of view the difference betwixt inſtinct and reaſon. There are no improvements made by man, but what we ſee carried ſtill further by ſucceeding generations; but in bees, and in all inferior animals, we ſee preciſely the ſame economy and contrivance now, in conſtructing their cells, building their neſts, laying up proviſions, &c. as at the beginning; and that in all ages, and in all generations, they have neither improved, nor departed from, that fixed ſyſtem aſſigned to them by nature, for their preſervation and guidance; whereas men, acting by reaſon and ſcience, improve from the labours and inventions of each other. Were we to attribute reaſon inſtead of inſtinct to bees, in the conſtruction of their combs, we ſhould at the ſame time admit them to be rational creatures, endued with thinking and reaſoning faculties far ſuperior to men; for the principle upon which the honey-comb is conſtructed, is founded on thoſe high departments of the mathematics, which were altogether unknown to the human race till the beginning of the preſent century, and which at this moment are beyond the comprehenſion of nine-tenths of mankind in the moſt enlightened nations on earth. Hence it is plain that the contrivance is not in the bees, but in the Creator of the bees, who directs them, and all brute creatures, to act by an inſtinct for their own immediate benefit, without knowing the principles upon which they act. And this is by no means contrary to reaſon; for we daily ſee men, working under the direction of others of ſuperior underſtanding, to effect purpoſes, and accompliſh ends, without having themſelves any idea of either; and, if we look through the endleſs variety of human avocations, we ſhall find that the greater part of mankind ſeem deſtined by God and nature to be governed in this way. But to proceed—

Caterpillars, when ſhaken off a tree in every direction, inſtantly turn round towards the trunk, and climb up, though they had never formerly been on the ſurface of the ground. This is a ſtriking inſtance of inſtinct. On the tree, and not upon the ground, the caterpillar finds its food. If therefore it did not turn and climb up the trunk, it would inevitably periſh. The ſolitary waſp digs holes in the ſand, in each of which ſhe depoſits an egg: ſhe collects a few ſmall green worms, which ſhe rolls up in a circular form, and fixes in the hole in ſuch a manner that they cannot move. When the waſp-worm is hatched, it is amply ſtored with the food which nature has deſtined for its ſupport. The green worms are devoured in ſucceſſion; and the number depoſited is exactly proportioned to the time neceſſary for the growth and transformation of the waſp-worm into a fly; then it iſſues from the hole, and is capable of procuring its own nouriſhment. This inſtinct

ſtinct of the parent-waſp is the more remarkable, that ſhe feeds not upon fleſh herſelf. Birds of the ſame ſpecies, unleſs when reſtrained by peculiar circumſtances, uniformly build their neſts of the ſame materials, and in the ſame form and ſituation, though they inhabit very different climates; and the form and ſituation are always exactly ſuited to their nature, and calculated to afford them ſhelter and protection. When danger, or any other circumſtance peculiar to certain countries, renders a deviation from the common form or ſituation of neſts neceſſary, that deviation is made in an equal degree, and in the very ſame manner, by all the birds of one ſpecies; and it is never found to extend beyond the limits of the country where alone it can ſerve any good purpoſe. When removed by neceſſity from their eggs, birds return to them with haſte and anxiety, and ſhift them ſo as to heat them equally; and it is worthy of obſervation, that their haſte to return is always in proportion to the coldneſs of the climate. Thus the oſtrich in Senegal, where the heat is exceſſive, neglects her eggs during the day, but ſits upon them in the night. At the Cape of Good Hope, however, where the degree of heat is leſs, the oſtrich, like other birds, ſits upon her eggs both day and night. In countries infeſted with monkeys, many birds, which in other climates build in buſhes and clefts of trees, ſuſpend their neſts upon ſlender twigs, and thus elude the rapacity of their enemies.

The following is remarkable.—A cat frequented a cloſet, the door of which was faſtened by an iron latch. A window was ſituated near the door. When the door was ſhut, the cat gave herſelf no uneaſineſs. As ſoon as ſhe was tired of her confinement, ſhe mounted on the ſill of the window, and with her paw dexterouſly lifted the latch, and came out. This practice, which we are told continued for years, muſt have been the conſequence of reaſoning in particular ideas. It could not be the effect of inſtinct; for inſtinct is adapted only to a ſtate of nature, in which cats have neither latches to lift nor doors to open; and as it is not ſaid that the animal attempted to lift the latches of other doors, we are not authoriſed to infer that this particular action was the conſequence of reaſoning in ideas enlarged by abſtraction: the cat had repeatedly ſeen one door opened by an exertion which ſhe was capable of imitating. It is well known that crows feed upon ſeveral kinds of ſhell-fiſh when within their reach; and that they contrive to break the ſhell by raiſing the fiſh to a great height, and letting it drop upon a ſtone or a rock. This may perhaps be conſidered as pure inſtinct, directing the animal to the proper means of acquiring its food. But what is to be thought of the following fact, communicated by a gentleman whoſe veracity is unqueſtioned, and who, being totally unacquainted with the theories of philoſophers, has of courſe no favourite hypotheſis to ſupport? In the ſpring of the year 1791, a pair of crows made their neſt in a tree, of which there are ſeveral planted round his garden; and in his morning-walks

he had often been amuſed by witneſſing furious combats between them and a cat. One morning the battle raged more fiercely than uſual, till at laſt the cat gave way and took ſhelter under a hedge, as if to wait a more favourable opportunity of retreating to the houſe. The crows continued for a ſhort time to make a threatening noiſe: but, perceiving that on the ground they could do nothing more than threaten, one of them lifted a ſtone from the middle of the garden, and perched with it on a tree planted in the hedge, where ſhe ſat watching the motions of the enemy of her young. As the cat crept along under the hedge, the crow accompanied her by flying from branch to branch, and from tree to tree; and, when at laſt puſs ventured to quit her hiding-place, the crow, leaving the trees and hovering over her in the air, let the ſtone drop from on high on her back. That the crow on this occaſion reaſoned, is ſelf-evident, and it ſeems to be little leſs evident, that the ideas employed in her reaſoning were enlarged beyond thoſe which ſhe had received from her ſenſes. By her ſenſes ſhe may have perceived, that the ſhell of a fiſh is broken by a fall; but could her ſenſes inform her, that a cat would be wounded or driven off the field by the fall of a ſtone? No; from the effect of the one fall preſerved in her memory, ſhe muſt have inferred the other by her power of reaſoning.

As to the natural affection of brutes, ſays an ingenious writer, "the more I reflect on it, the more I am aſtoniſhed at its effects." It ſeems to awaken the paſſions, quicken the invention, and ſharpen the ſagacity, of the brute creation. Thus a hen, juſt become a mother, is no longer that placid bird ſhe uſed to be, but with feathers ſtanding on end, wings hovering, and clocking note, ſhe flies at every thing which ſeems to threaten her brood. Dams will throw themſelves in the way of the greateſt danger, in order to avert it from their progeny. Thus a partridge will tumble along before a ſportſman, in order to draw away the dogs from her helpleſs covey. In the time of nidification the moſt feeble birds will aſſault the moſt rapacious. All the hirundines of a village are up in arms at the ſight of a hawk, whom they will perſecute till he leaves that diſtrict. A very exact obſerver has often remarked, that a pair of ravens neſtling in the rock of Gibraltar, would ſuffer no vulture or eagle to reſt near their ſtation, but would drive them from the hill with an amazing fury: even the blue thruſh at the ſeaſon of breeding would dart out from the clefts of the rocks to chaſe away the keſtril or the ſparrow-hawk. If you ſtand near the neſt of a bird that has young, ſhe will not be induced to betray them by an inadvertent fondneſs, but will wait about at a diſtance, with meat in her mouth, for an hour together.

A moſt ſingular effect of inſtinct may be obſerved in the means by which cuckows are propagated. Unlike the generality of birds, they do not pair. When a female appears on the wing, ſhe is often attended by two or three males, who

ſeem

ſeem to be earneſtly contending for her favours. From the time of her appearance till after the middle of ſummer, the neſts of the birds ſelected to receive her egg are to be found in great abundance; but, like the other migrating birds, ſhe does not begin to lay till ſome weeks after her arrival. It is on all hands allowed, that the cuckow does not hatch its own eggs. The hedge-ſparrow, the water-wagtail, the titlark, the red-breaſt, the yellow-hammer, the green-linnet, or the winchat, is generally the nurſe of the young cuckow. It may be ſuppoſed, that the female cuckow lays her egg in the abſence of the bird in whoſe neſt ſhe intends to depoſit; as it has been known, that, on ſight of one of theſe, a red-breaſt and its mate jointly attacked her on approaching the neſt, putting her to flight; and ſo effectually drove her away, that ſhe did not dare to return. Among the birds above mentioned, it generally ſelects the three firſt, but ſhows a much greater partiality to the hedge-ſparrow. This laſt commonly takes up four or five days in laying her eggs. During this time (generally after ſhe has laid one or two), the cuckow contrives to depoſit her egg among the reſt, leaving the future care of it entirely to the hedge-ſparrow. When the hedge-ſparrow has ſat her uſual time, and diſengaged the young cuckow and ſome of her own offspring from the ſhell, her own young ones, and any of her eggs that remain unhatched, are ſoon turned out, the young cuckow remaining poſſeſſor of the neſt, and ſole object of her future care. The young birds are not previouſly killed, nor are the eggs demoliſhed; but all are left to periſh together, either entangled about the buſh which contains the neſt, or lying on the ground under it. The early fate of the young hedge-ſparrow (ſays Mr. Jenner, who made theſe experiments) is a circumſtance that has been noticed by others, but attributed to wrong cauſes; but the true cauſe we ſhall preſently explain. A variety of conjectures have been formed upon it. A cuckow laid her egg in a water-wagtail's neſt in the thatch of an old cottage. The wagtail ſat her uſual time, and then hatched all the eggs but one; which, with all the young ones except the cuckow, was turned out of the neſt. The young birds, conſiſting of five, were found upon the rafter that projected from under the thatch, and with them was an egg not in the leaſt injured. The cuckow was reared by the wagtails till it was nearly capable of flying, when it was killed by an accident.

A hedge-ſparrow built her neſt in a hawthorn-buſh in a timber-yard. After ſhe had laid two eggs, a cuckow dropped in a third. The ſparrow continued laying as if nothing had happened, till ſhe had laid five, her uſual number, and then ſat. On inſpecting the neſt, June 20, 1786, (ſays Mr. Jenner,) I found that the bird had hatched this morning, and that every thing but the young cuckow was thrown out. Under the neſt I found one of the young hedge-ſparrows dead, and one egg by the ſide of the neſt entangled with the coarſe woody materials that formed its outſide

ſide covering. On examining the egg, I found one end of the ſhell a little cracked, and could ſee that the ſparrow it yet contained was alive. It was then reſtored to the neſt, but in a few minutes was thrown out. The egg, being again ſuſpended by the outſide of the neſt, was ſaved a ſecond time from breaking. To ſee what would happen if the cuckow was removed, I took out the cuckow, and placed the egg containing the hedge-ſparrow in the neſt in its ſtead. The old birds, during this time, flew about the ſpot, ſhowing ſigns of great anxiety; but, when I withdrew, they quickly came to the neſt again. On looking into it in a quarter of an hour afterwards, I found the young one completely hatched, warm, and lively. The hedge-ſparrows were ſuffered to remain undiſturbed with their new charge for three hours (during which time they paid every attention to it), when the cuckow was again put into the neſt; and, on examining it again in a few minutes, I found the young ſparrow was tumbled out. It was a ſecond time reſtored, but again experienced the ſame fate. From theſe experiments, and ſuppoſing, from the feeble appearance of the young cuckow juſt diſengaged from the ſhell, that it was utterly incapable of diſplacing either the egg or the young ſparrows, I was induced to believe that the old ſparrows were the only agents in this ſeemingly-unnatural buſineſs. But I afterwards clearly perceived the cauſe of this ſtrange phenomenon, by diſcovering the young cuckow in the act of diſplacing its fellow-neſtlings, as the following relation will fully evince. June 18, 1787, I examined the neſt of a hedge-ſparrow, which then contained a cuckow's and three hedge-ſparrow's eggs. On inſpecting it the day following, I found the bird had hatched, but that the neſt now contained only a young cuckow and one young hedge-ſparrow. The neſt was placed ſo near the extremity of a hedge, that I could diſtinctly ſee what was going forward in it; and, to my aſtoniſhment, ſaw the young cuckow, though ſo newly hatched, in the act of turning out the young hedge-ſparrow. The mode of accompliſhing this was very curious. The little animal, with the aſſiſtance of its rump and wings, contrived to get the bird upon its back; and making a lodgement for the burden by elevating its elbows, clambered backward with it up the ſide of the neſt, till it reached the top; where reſting for a moment, it threw off its load with a jerk, and quite diſengaged it from the neſt. It remained in this ſituation a ſhort time, feeling about with the extremities of its wings, as if to be convinced whether the buſineſs was properly executed, and then dropped into the neſt again. With theſe (the extremities of its wings) I have often ſeen it examine, as it were, an egg and neſtling before it began its operations; and the nice ſenſibility which theſe parts appeared to poſſeſs, ſeemed ſufficiently to compenſate the want of ſight, which as yet it was deſtitute of. I afterwards put in an egg; and this, by a ſimilar proceſs, was conveyed to the edge of the neſt and thrown out. Theſe experiments

ment I have ſince repeated ſeveral times in different neſts, and have always found the young cuckow diſpoſed to act in the ſame manner. In climbing up the neſt, it ſometimes drops its burden, and thus is foiled in its endeavours; but, after a little reſpite, the work is reſumed, and goes on almoſt inceſſantly till it is effected. It is wonderful to ſee the extraordinary exertions of the young cuckow, when it is two or three days old, if a bird be put into the neſt with it that is too weighty for it to lift out. In this ſtate it ſeems ever reſtleſs and uneaſy. The ſingularity of its ſhape is well adapted to theſe purpoſes; for, different from other newly-hatched birds, its back, from the ſcapulæ downward, is very broad, with a conſiderable depreſſion in the middle. This depreſſion ſeems formed by nature for the deſign of giving a more ſecure lodgement to the egg of the hedge-ſparrow, or its young one, when the young cuckow is employed in removing either of them from the neſt. When it is about twelve days old, this cavity is quite filled up, and then the back aſſumes the ſhape of neſtling birds in general.

It appears a little extraordinary that two cuckows eggs ſhould ever be depoſited in the ſame neſt, as the young one produced from one of them muſt inevitably periſh; yet two inſtances of this kind fell under our author's obſervation, one of which he thus relates: Two cuckows and a hedge-ſparrow were hatched in the ſame neſt this morning, (June 27, 1787;) one hedge-ſparrow's egg remained unhatched. In a few hours after, a conteſt began between the cuckows for the poſſeſſion of the neſt, which continued undetermined till the next afternoon, when one of them, which was ſomewhat ſuperior in ſize, turned out the other, together with the young hedge-ſparrow and the unhatched egg. This conteſt was very remarkable. The combatants alternately appeared to have the advantage, as each carried the other ſeveral times nearly to the top of the neſt, and then ſunk down again, oppreſſed by the weight of its burden; till at length, after various efforts, the ſtrongeſt prevailed, and was afterwards brought up by the hedge-ſparrows.

But the principal circumſtance that has agitated the mind of naturaliſts reſpecting the cuckow is, why, like other birds, it ſhould not build a neſt, incubate its eggs, and rear its own young? The moſt probable ſuggeſtion is, the ſhort reſidence this bird is allowed to make in the country where it is deſtined to propagate its ſpecies; and the call that nature has upon it, during that reſidence, to produce a numerous progeny. The cuckow's firſt appearance here is about the middle of April, commonly on the 17th. Its egg is not ready for incubation till ſome weeks after its arrival, ſeldom before the middle of May. A fortnight is taken up by the ſitting bird in hatching the egg. The young bird generally continues three weeks in the neſt before it flies, and the foſter-parents feed it more than five weeks after this period; ſo that, if a cuckow ſhould be ready with an egg much ſooner

than the time pointed out, not a ſingle neſtling, even one of the earlieſt, would be fit to provide for itſelf before its parent would be inſtinctively directed to ſeek a new reſidence, and be thus compelled to abandon its young one; for old cuckows take their final leave of this country the firſt week in July. Among the many peculiarities of the young cuckow, there is one that ſhows itſelf very early. Long before it leaves the neſt, it frequently, when irritated, aſſumes the manner of a bird of prey, looks ferocious, throws itſelf back, and pecks at any thing preſented to it, with great vehemence, often at the ſame time making a chuckling noiſe like a young hawk. Hence probably the vulgar opinion, that this bird changes into a hawk, and devours its nurſe on quitting its neſt; whence the French proverb, *Ingrat comme un coucou*, "As ungrateful as a cuckow." Sometimes, when diſturbed in a ſmaller degree, it makes a kind of hiſſing noiſe, accompanied with a heaving motion of the whole body. From what has been ſaid, it becomes evident, that the ſame inſtinctive impulſe which directs the cuckow to depoſit her eggs in the neſts of other birds, directs her young one to throw out the eggs and young of the owner of the neſt. The ſcheme of nature would be incomplete without it; for it would be extremely difficult, if not impoſſible, for the little birds deſtined to find ſuccour for the cuckow, to find it alſo for their own young ones after a certain period; nor would there be room for them to inhabit the neſt. Cuckows may be, and often are, brought up tame, ſo as to become familiar. They will eat in this ſtate bread and milk, fruits, inſects, eggs, and fleſh, either cooked or raw; but in a ſtate of nature, they chiefly live on caterpillars. When fat, they are ſaid to be as good eating as a land-rail: the French and Italians eat them to this day. The ancient Romans admired them greatly as food: Pliny ſays that there is no bird which can be compared to them for delicacy. In migrating, the major part of theſe birds are ſuppoſed to go into Africa; ſince they are obſerved to viſit the iſland of Malta twice in a year, in their paſſage backwards and forwards, as is ſuppoſed, to that part of the world.

The inſtinct which has been diſcovered in ants, beavers, &c. is too well known and admired, to need any mention in this place: and we ſee in a great variety of birds, inſects, and quadrupeds, a ſimilar economy in laying up ſtores of proviſion in time of plenty, that they might have acceſs to it in time of need. The common daw has a peculiar knack of this ſort; and, in houſes where they have been brought up tame, have frequently been known to hide, with their meat, money, rings, ſeals, lockets, and other ſmall trinkets, thereby occaſioning injurious ſuſpicions of theft in ſervants or others, who are perfectly innocent.

We have a remarkable anecdote given by the Rev. Mr. Robinſon of Ouſby in Weſtmoreland, relative to an inſtinct in crows, by which they are made the natural

tural planters of all ſorts of wood and trees. They diſſeminate the kernels upon the earth, which like nurſeries bring them forth till they grow up to their natural ſtrength and perfection. He ſays, "About twenty-five years ago, coming from Roſecaſtle early in the morning, I obſerved a great number of crows very buſy at their work upon a declining ground of a moſſy ſurface; I went out of my way on purpoſe to view their labour, and I found they were planting a grove of oaks. The manner of their planting was thus: they firſt made little holes in the earth with their bills, going about and about till the hole was deep enough; and then they dropped in the acorn, and covered it with earth and moſs. The ſeaſon was at the latter end of autumn, when all ſeeds are full ripe." Mr. Robinſon ſeems to think that Providence had given the crows this inſtinct ſolely for the propagation of trees; but I imagine it was given them principally for their own preſervation, by hiding proviſion in time of plenty, in order to ſupply them in a time of ſcarcity; ſo that ſuch an inſtinct in theſe birds may anſwer a double purpoſe; both their own ſupport in times of need, and the propagation of the trees they plant: for, wherever they hide a great number of nuts or grains in the earth, we cannot ſuppoſe they find them all again; but that as many will remain in the plot of ground they make uſe of, as can well grow by one another.

A wonderful ſpirit of ſociality in the brute creation, independent of ſexual attachment, has been frequently remarked. Many horſes, though quiet with company, will not ſtay one minute in a field by themſelves: the ſtrongeſt fences cannot reſtrain them. A horſe has been known to leap out at a ſtable-window through which dung was thrown, after company; and yet in other reſpects to be remarkably quiet. Oxen and cows will not fatten by themſelves; but will neglect the fineſt paſture that is not recommended by ſociety. It would be needleſs to inſtance in ſheep, which conſtantly flock together. But this propenſity ſeems not to be confined to animals of the ſame claſs or ſpecies. Even great diſparity of kind and ſize does not always prevent ſocial advances and mutual fellowſhip. Of this the following remarkable inſtance is given: A gentleman who kept but one horſe, happened alſo on a time to have but one ſolitary hen: theſe two incongruous animals ſpent much of their time together in a lonely orchard, where they ſaw no creature but each other: by degrees an apparent regard began to take place between theſe two ſequeſtered individuals: the fowl would approach the quadruped with notes of complacency, rubbing herſelf gently againſt his legs; while the horſe would look down with ſatisfaction, and move with the greateſt caution and circumſpection, leſt he ſhould trample on his diminutive companion; and thus by mutual good offices each ſeemed to conſole the vacant hours of the other.

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In the Gentleman's Magazine for March 1788, we have the following anecdotes of a raven. The raven alluded to "lives, or did live three years ſince, at the Red Lion at Hungerford; his name, I think, is Rafe. You muſt know then, that, coming into that inn, my chaiſe ran over and bruiſed the leg of my Newfoundland dog; and, while we were examining the injury done to the dog's foot, Rafe was evidently a concerned ſpectator; for, the minute the dog was tied up under the manger with my horſe, Rafe not only viſited, but fetched him bones, and attended upon him with particular and repeated marks of kindneſs. The bird's notice of the dog was ſo marked, that I obſerved it to the hoſtler; for I had not heard a word before of the hiſtory of this benevolent creature. John then told me, that he had been bred from his pin-feather in intimacy with a dog; that the affection between them was mutual; and that all the neighbourhood had often been witneſſes of the innumerable acts of kindneſs they had conferred upon each other. Rafe's poor dog, after a while, unfortunately broke his leg; and during the long time he was confined, Rafe waited upon him conſtantly, carried him his proviſions daily, and never ſcarcely left him alone! One night by accident the hoſtler had ſhut the ſtable door, and Rafe was deprived of the company of his friend the whole night; but the hoſtler found in the morning the bottom of the door ſo pecked away, that, had it not been opened, Rafe would in another hour have made his own entrance-port. I then enquired of my landlady, and heard what I have related confirmed by her, with ſeveral other ſingular traits of the kindneſſes this bird ſhows to all dogs in general, but particularly to maimed or wounded ones. I hope and believe, however, the bird is ſtill living; and the traveller will find I have not over-rated his merit."

To theſe inſtances of attachment between incongruous animals from a ſpirit of ſociality or the feelings of ſympathy, may be added the following inſtance of fondneſs from a different motive, recounted by Mr. White, in his Hiſtory of Selborne: "My friend had a little helpleſs leveret brought to him, which the ſervants fed with milk in a ſpoon; and about the ſame time his cat kittened, and the young were diſpatched and buried. The hare was ſoon loſt, and ſuppoſed to be gone the way of moſt foundlings, or killed by ſome dog or cat. However, in a fortnight after, as the maſter was ſitting in his garden in the duſk of the evening, he obſerved his cat, with tail erect, trotting towards him, and calling with little ſhort inward notes of complacency, ſuch as they uſe towards their kittens, and ſomething gamboling after, which proved to be the leveret, which the cat had ſupported with her milk, and continued to ſupport with great affection. Thus was a graminivorous animal nurtured by a carnivorous and predacious one! Why ſo cruel and ſanguinary a beaſt as a cat, of the ferocious genus of felis, the murium leo,

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as Linnæus calls it, ſhould be affected with any tenderneſs towards an animal which is its natural prey, is not ſo eaſy to determine. This ſtrange affection probably was occaſioned by that deſiderium, thoſe tender maternal feelings, which the loſs of her kittens had awakened in her breaſt; and by the complacency and eaſe ſhe derived to herſelf from procuring her teats to be drawn, which were too much diſtended with milk, till from habit ſhe became as much delighted with this foundling as if it had been her real offspring. This incident is no bad ſolution of that ſtrange circumſtance which grave hiſtorians as well as poets aſſert, of expoſed children being ſometimes nurtured by female wild beaſts that had probably loſt their young. For it is not one whit more marvellous that Romulus and Remus, in their infant ſtate, ſhould be nurſed by a ſhe-wolf, than that a poor little ſucking leveret ſhould be foſtered and cheriſhed by a bloody grimalkin.

That brute animals poſſeſs reflection and ſentiment, and are ſuſceptible of the kindly as well as the irraſcible paſſions, independently of ſexual attachment and natural affection; and that they have a great ſhare of fidelity, of pride, and even a ſenſe of glory; may be demonſtrated from the elephant, the horſe, and the dog. Elephants, even in a ſavage ſtate, are peaceable and gentle creatures. They never uſe their weapons but in defence of themſelves or companions. Their ſocial diſpoſitions are ſo ſtrong, that they are ſeldom found alone, but march always in large troops: the oldeſt and moſt experienced lead the van; the younger or lame ones keep in the middle; and thoſe of a ſecond rate, as to age, walk in the rear. The females carry their young on their tuſks, embracing them at the ſame time with their trunk. They ſeldom march in this regular order but when they reckon the journey dangerous, ſuch as an expedition to cultivated lands, where they expect to meet with reſiſtance. On other occaſions they are leſs cautious; ſome of them falling behind or ſeparating from the reſt, but ſeldom ſo far as to be without the reach of aſſiſtance by alarming and aſſembling their companions. It is dangerous to offer them the leaſt injury; for they run ſtraight upon the offender; and, although the weight of their body be great, their ſteps are ſo large, that they eaſily outrun the ſwifteſt man, whom they either pierce with their tuſks, or ſeize with their trunk, dart him in the air like a ſtone, and then trample him under their feet. But they never attack any perſon unleſs when provoked. However, as they are extremely ſenſible and delicate with regard to injuries, it is always prudent to keep out of their way. Travellers who frequent thoſe countries kindle large fires, and beat drums, during the night, in order to prevent their approach. After being once attacked by men, or falling into any ambuſh, they are ſaid never to forget

the injury, but ſearch for every opportunity of getting revenge. As they are endowed perhaps with a more exquiſite ſenſation of ſmell than any other animal, owing to the great extent of their noſe, they can ſcent a man at a very great diſtance, and trace him by his footſteps.

The elephant, when tamed, is the moſt friendly and obedient of all animals; he is entirely attached to the perſon who feeds and takes care of him. In a ſhort time he underſtands ſigns, and the ſound of his maſter's voice. He diſtinguiſhes the language of paſſion, of command, of ſatisfaction; and acts accordingly. He receives his orders with attention; and executes them with prudence and alacrity, but without precipitation. He eaſily learns to bow his knees and lower his body, for the convenience of thoſe who mount him. He careſſes his friends with his trunk. He lifts burdens with his trunk, and aſſiſts thoſe who are loading him in laying them on his back. He delights in ſhining harneſs and trappings. When yoked in a cart or waggon, he pulls equally and cheerfully, unleſs he be abuſed by injudicious chaſtiſement. His guide is generally mounted on his neck, with a ſmall rod of iron, ſharp at the point, in his hand; he directs his motion by pricking him on the ears and head; but, for the moſt part, a word is ſufficient. A tame elephant will do more labour than ſix horſes; but then he requires a proportional quantity of food. They are the principal beaſts of burden in many parts of Africa and the Eaſt Indies. They carry ſacks and bundles of all kinds on their neck, back, and tuſks. They never loſe or damage any thing committed to their care: they will ſtand on the edge of a river, take bundles off their necks and tuſks, lay them carefully in a boat, whenever they are deſired, and try with their trunk whether they are properly ſituated; if they be loaded with caſks, they go in queſt of ſtones to prop them and prevent them from rolling. The elephant is not only the moſt tractable, but the moſt intelligent, of animals; ſenſible of benefits, and reſentful of injuries. In India, they were once employed in the launching of ſhips: one was directed to force a very large veſſel into the water; the work proved ſuperior to his ſtrength; his maſter, with a ſarcaſtic tone, bade the keeper take away this lazy beaſt and bring another: the poor animal inſtantly repeated his efforts, fractured his ſkull, and died on the ſpot. In Delhi, an elephant, paſſing along the ſtreets, put his trunk into a tailor's ſhop where ſeveral people were at work; one of them pricked the end with his needle: the beaſt paſſed on; but at the next dirty puddle filled his trunk with water, returned to the ſhop, and, ſpirting every drop among the people who had offended him, ſpoiled their work. An elephant in Adſmeer, which often paſſed through the bazar, or market, as he went by a certain herb-woman, always received from her a mouthful of greens: at

length he was ſeized with one of his periodical fits of rage, broke his fetters, and, running through the market, put the crowd to flight; among others, this woman, who in haſte forgot a little child ſhe had brought with her. The animal, recollecting the ſpot where his benefactreſs was wont to ſit, took up the infant gently in his trunk, and placed it in ſafety on a ſtall before a neighbouring houſe. Another in his madneſs, killed his cornac, or governor: the wife, ſeeing the misfortune, took her two children and flung them before the elephant, ſaying, "Now you have deſtroyed their father, you may as well put an end to their lives and mine." It inſtantly ſtopped, relented, took the greateſt of the children, placed him on its neck, adopted him for his cornac, and never afterwards would permit any body elſe to mount it. A ſoldier at Pondicherry, who was accuſtomed, whenever he received the portion that came to his ſhare, to carry a certain quantity of it to one of theſe animals, having one day drank rather too freely, and finding himſelf purſued by the guards, who were going to take him to priſon, took refuge under the elephant's body, and fell aſleep. In vain did the guard try to force him from this aſylum, as the elephant protected him with his trunk. The next morning the ſoldier, recovering from his drunken fit, ſhuddered with horror to find himſelf ſtretched under the belly of this huge animal. The elephant, who without doubt perceived the man's embarraſſment, careſſed him with his trunk, in order to inſpire him with courage and make him underſtand that he might now depart in ſafety. A painter was deſirous of drawing the elephant which was kept in the menagerie at Verſailles in an uncommon attitude, which was that of holding his trunk raiſed up in the air with his mouth open. The painter's boy, in order to keep the animal in this poſture, threw fruit into his mouth; but as the lad frequently deceived him, and made an offer only of throwing him the fruit, he grew angry; and, as if he had known that the painter's intention of drawing him was the cauſe of the affront that was offered him, inſtead of revenging himſelf on the lad, he turned his reſentment on the maſter, and, taking up a quantity of water in his trunk, threw it on the paper on which the painter was drawing, and ſpoiled it. At the Cape of Good Hope, it is cuſtomary to kill theſe animals for the ſake of their teeth, by the chaſe. Three horſemen, well mounted and armed with lances, attack the elephant alternately, each relieving the other as they ſee their companion preſſed, till the beaſt is ſubdued. Three Dutchmen (brothers), who had made large fortunes by this buſineſs, determined to retire to Europe, and enjoy the fruits of their labours; but reſolved, before they went, to have a laſt chace by way of amuſement: they met with their game, and began the attack in the uſual manner; but unfortunately one of their horſes

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fell down and flung its rider: the enraged animal inſtantly ſeized the unhappy man with its trunk, flung him up to a vaſt height in the air, and received him on one of his tuſks; then turning towards the two other brethren, as if it were with an aſpect of revenge and inſult, held out to them the impaled wretch writhing on the bloody tooth.

When the elephant is properly managed, he lives very long even in a ſtate of ſlavery and labour: that ſome have lived in this ſtate an hundred and thirty years, is pretty well authenticated. In a natural ſtate they often exceed two hundred years, and propagate their ſpecies till they are an hundred and twenty: it is thirty years before they come to their full growth. The mode of connection between the male and female is now aſcertained beyond the poſſibility of doubt; as Mr. Buller, Lieut. Hawkins, and many others, ſaw a male copulate with a female, after they were ſecured, in the Eaſt-Indies, in a manner exactly ſimilar to the conjunction of the horſe with a mare. This fact entirely overturns what has been ſo often related concerning the ſuppoſed delicacy of this uſeful animal, and a variety of other hypotheſes, which are equally void of foundation. The time an elephant goes with young, has been aſcertained to be ſomewhat leſs than two years, as an elephant brought forth a young one twenty-one months and three days after ſhe was taken. She was obſerved to be with young in April or May 1788, and ſhe was only taken in January preceding; ſo that it is very likely ſhe muſt have had connection with the male ſome months before ſhe was ſecured, otherwiſe they could not diſcover that ſhe was with young, as a fœtus of leſs than three months cannot well be ſuppoſed to make any alteration in the ſize or ſhape of ſo large an animal. The young one, a male, was produced October 16, 1789, and appeared in every reſpect to have arrived at its full time. He was thirty-five inches high at his birth, and grew four inches in nearly as many months. Elephants are always meaſured at the ſhoulder; for the arch or curve of the back, of young ones particularly, is conſiderably higher than any other part, and it is a ſure ſign of old age whenever this curve is found flattened or conſiderably depreſſed, after an elephant has once attained its full growth. The young elephants ſuck conſtantly with their mouths, and never with their trunks, as Buffon has aſſerted; a concluſion he made merely from conjecture, and the great and various uſes to which the trunk is adapted and applied by every elephant.—The approach of the rutting-ſeaſon is eaſily known; for ſome days before it happens, an oily liquor flows from a ſmall hole on each ſide of the head. The domeſtic female on theſe occaſions ſometimes makes her eſcape, and joins the wild males in the woods. Some days afterwards her cornac goes in queſt of her, and calls her by her name till ſhe comes. She ſubmits to him with complacence, and allows herſelf to be conducted home, and

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ſhut up in the ſtable. They bring forth but one at a time, though the female has two dugs, one on each ſide the breaſt. The young one, as ſoon as it comes into the world, is as large as a wild boar, and is furniſhed with teeth: however, the large tuſks do not make their appearance till ſome time after, and at the age of ſix months they are ſeveral inches long. Elephants of this age are as large as an ox when in a natural ſtate.

The intrepidity and ſagacity of the HORSE have been regarded with admiration by all ranks of men, and in all ages of the world. Even in a domeſtic ſtate he is bold and fiery; and, equally undaunted as his maſter, faces danger and death with ardour and magnanimity. He delights in the noiſe and tumult of arms, and ſeems to feel the glory of victory: he exults in the chace; his eyes ſparkle with emulation in the courſe. But, though bold and intrepid, he is docile and tractable: he knows how to govern and check the natural vivacity and fire of his temper. He not only yields to the hand, but ſeems to conſult the inclination of his rider. Conſtantly obedient to the impreſſions he receives, his motions are entirely regulated by the will of his maſter. He in ſome meaſure reſigns his very exiſtence to the pleaſure of man. He delivers up his whole powers, he reſerves nothing; he will rather die than diſobey. Who could endure to ſee a character ſo noble, abuſed? who could be guilty of ſuch groſs barbarity? none but wretches moſt relentleſs and unfeeling! We need go no further than the horſe, to prove how ſtrongly nature has endowed brute animals with memory; for whatever roads, paſtures, inns, or ſtables, a horſe has been accuſtomed to, though removed for years to a diſtant part of the country, he never forgets them; but, if ever he returns, or paſſes by them again, he gives evident tokens that he has been accuſtomed to the place. The celebrated equeſtrians, Hughes and Aſtley, could, I doubt not, furniſh a thouſand curious anecdotes to illuſtrate this fact; but the following, I think, being incontrovertible, will be ſufficient for the purpoſe.

Mr. James George, a gentleman of Southampton, in the county of Hants, loſt his horſe from off the common on which he had been accuſtomed to be turned out. About twelve months after, the horſe was ſeen and recognized, grazing on a common near Burſledon. Soon as this was made known, Mr. George ſent his ſervant with a bridle, and ordered the horſe to be caught, and brought home. In a few days after, a Mr. Langtree of Burſledon came to Mr. George, to demand the horſe, inſiſting it was his property, and had been ſo for years The horſe, however, being poſitively withheld, Mr. Langtree brought an action for his recovery, which was tried at Wincheſter aſſiſes, in March 1789. The plaintiff, on the poſitive affirmations of ſix or ſeven witneſſes, traced the ſale of the horſe from one dealer's hands to another, as far back as the year 1784, when he

was purchaſed of one farmer Moſes, in the county of Suſſex, who bred him; and the horſe was identified by them all. On the part of the defendant, the moſt poſitive evidence was adduced, to ſhow that this horſe was not the horſe ſworn to have been ſo bought and ſold by the witneſſes on the other ſide, but was, and had been, the real property of Mr. George, from the year 1786. In this ſituation, with the horſe equally ſworn to and identified by the witneſſes on both ſides, who had all been to inſpect him but the day before the trial, the judge by croſs-examining the laſt witneſs, diſcovered, that, when the defendant's ſervant brought the horſe back, he turned him into his old paſturage on Southampton common, where he had not been many minutes, before he ſet off, of his own accord, towards Southampton; and in his way croſſed a number of lanes, and turnings, paſſed by eight or ten ſtables, until he came to the ſtable of Mr. George, where he inſtantly ſtopped, and neighed at the ſtable-door, as much as to ſay he was come back, and begged to be taken in. This circumſtance decided the verdict. The learned judge remarked, that there could be no colluſion in the evidence derived from the *memory of the horſe;* and directed the jury to find for the defendant.

This character, though natural to the animal, is improved by habit and education. His education commences with the loſs of liberty, and is finiſhed by conſtraint. In the vaſt deſerts of America, they roam at large without any reſtraint. M. de Salle relates, that he ſaw, in the year 1685, horſes feeding in the meadows of North America, near the bay of St. Louis, which were ſo ferocious that nobody durſt come near them. Oexmelin ſays, that he has ſeen large troops of them in St. Domingo running in the valleys; that, when any perſon approached, they all ſtopped; and one of them would advance till within a certain diſtance, then ſnort with his noſe, take to his heels, and the whole troop after him. Theſe relations ſufficiently prove, that the horſe, when at full liberty, has no inclination to aſſociate with mankind: that all the ſoftneſs and ductility of his temper proceed entirely from the culture and poliſh he receives in his domeſtic education, which in ſome meaſure commences as ſoon as he is brought forth.—The horſe has not only a grandeur in his general appearance, but there is the greateſt ſymmetry and proportion in the different parts of his body. The regularity and proportion of the different parts of the head give him an air of lightneſs, which is well ſupported by the ſtrength and beauty of his cheſt. He erects his head, as if willing to exalt himſelf above the condition of other quadrupeds; his eyes are open and lively; his ears are handſome, and of a proper height; his mane adorns his neck, and gives him the appearance of ſtrength and boldneſs. At the age of two years, or two years and an half, the horſe is in a condition to propagate; and the mare, like moſt other females, is ready to receive him ſtill ſooner. But the foals produced

duced by ſuch early embraces are generally ill-made and weakly. The horſe ſhould never be admitted to the mare till he is four or four and a half; this is only meant with regard to draught-horſes. Fine horſes ſhould not be admitted to the mare before they are ſix years old; and Spaniſh ſtallions not till ſeven. The mares are generally in ſeaſon from the beginning of April to the end of June; but their chief ardour for the horſe laſts only about fifteen or twenty days, and this critical ſeaſon ſhould always be embraced. The ſtallion ought to be found, well-made, vigorous, and of a good breed. For fine ſaddle-horſes, foreign ſtallions, as Arabians, Turks, Barbs, and Andaluſians, are preferable to all others. Next to theſe, Britiſh ſtallions are the beſt; becauſe they originally ſprang from thoſe above-mentioned, and are very little degenerated. The ſtallions of Italy, and eſpecially the Neapolitans, are very good. The beſt ſtallions for draught or carriage horſes, are thoſe of Naples, Denmark, Holſtein, and Friezeland. The ſtallions for ſaddle-horſes ſhould be from fourteen to fifteen hands high, and for draught-horſes at leaſt fifteen hands. Neither ought the colour of ſtallions to be overlooked; as a fine black, grey, bay, ſorrel, cheſnut, &c. Beſides theſe external qualities, a ſtallion ought to have courage, tractability, ſpirit, agility, a ſenſible mouth, ſure limbs, &c. Theſe precautions in the choice of a ſtallion are the more neceſſary, becauſe he has been found by experience to communicate to his offspring almoſt all his good or bad qualities, whether natural or acquired.

To ſhow, more obviouſly, the reaſoning-faculty of brutes, and to diſtinguiſh the operations of intellect from thoſe of inſtinct, we need only contemplate the actions and diſpoſition of the DOG. In a ſavage ſtate, it muſt be allowed, that he is fierce, cruel, and voracious; but, when civilized and accuſtomed to live with men, he is poſſeſſed of every amiable quality. He ſeems to have no other deſire than to pleaſe and protect his maſter. He is gentle, obedient, ſubmiſſive, and faithful. Theſe diſpoſitions, joined to his almoſt unbounded ſagacity, juſtly claim the eſteem of mankind. Accordingly no animal is ſo much careſſed or reſpected: he is ſo ductile, and ſo much formed to pleaſe, that he aſſumes the very air and temper of the family in which he reſides. An animal endowed with ſuch uncommon qualities, muſt anſwer many uſeful purpoſes. His fidelity and vigilance are daily employed to protect our perſons, our flocks, or our goods. The acuteneſs of his ſmell gains him employment in hunting: he is frequently employed as a turnſpit: at Bruſſels and in Holland he is trained to draw little carts to the herb-market; and in the northern regions draws a ſledge with his maſter in it, or loaden with proviſions. It is a remarkable inſtinct in the dog, that, when oppreſſed with ſickneſs, to which he is very ſubject, eſpecially in the beginning of ſummer, and before ill weather, he eats the leaves of the quicken graſs, the bearded

bearded wheat-grafs, or the rough cock's-foot grafs, which gives him immediate relief by making him vomit. He does not throw out his excrements promiſcuouſly upon every thing that happens to be in the way, but carefully ſeeks ſtones, trunks of trees, or barren places. This is a wiſe inſtitution of nature; for the excrements of a dog deſtroy almoſt every vegetable or animal ſubſtance. They are of ſuch a putrid nature, that, if a man's ſhoe touches them when recently expelled, that particular part will rot in a few days. He obſerves the ſame method in making his urine, which he throws out at a ſide. It is remarkable, that a dog will not paſs a ſtone or a wall againſt which any other dog has urined, without following his example, although an hundred ſhould occur in a few minutes; inſomuch that it is aſtoniſhing how ſuch a quantity can be ſecreted in ſo ſhort a time. The principal objection to dogs, in the ſhocking circumſtance of their going mad, and of communicating the diſorder to whatever perſon, or animal, they may chance to bite; and of which the cure has ever been conſidered precarious and uncertain. From a minute inveſtigation of the poiſonous qualities of the hydrophobia, and the effect it has on the blood, as well as from a conſideration of what the blood and juices undergo by emerging the body in the ſea, I am bold to affirm that my Solar Tincture, adminiſtered in the way I have directed, is a certain and infallible cure for this deplorable malady; at leaſt as far as human certainty can go with reſpect to medicine. I would not however be underſtood to encourage a negligence in thoſe who keep dogs, to watch well their actions, and, on the ſmalleſt ſuſpicion that ſuch a misfortune is near, to have them inſtantly diſpatched, as they may be eaſily replaced, and much anxiety and diſtreſs prevented.—With regard to the propagation of dogs, the females admit the males before they are twelve months old. They remain in ſeaſon ten, twelve, or even fifteen, days, during which time they will admit a variety of males. They come in ſeaſon generally twice in the year, and more frequently in the cold than in the hot months. The male diſcovers the condition of the female by the ſmell; but ſhe ſeldom admits him the firſt ſix or ſeven days. One coition will make her conceive a great number of young; but, when not reſtrained, ſhe will admit ſeveral dogs every day; ſhe ſeems to have no choice or predilection, except in favour of large dogs; from this circumſtance it ſometimes happens, that a ſmall female, who has admitted a maſtiff, periſhes in bringing forth her young. During the time of copulation, theſe animals cannot ſeparate themſelves, but remain united ſo long as the erection ſubſiſts. This is owing to the ſtructure of the parts. The dog has not only a bone in his penis, but in the middle of the corpus cavernoſum there is a large hollow, which is blown up in the time of erection to a conſiderable bulk. The female, on the other hand, has a larger clitoris than perhaps any other animal: beſides, a large firm protuberance

riſes in the time of copulation, and remains perhaps longer than that of the male, and prevents him from retiring till it ſubſides; accordingly, after the act of penetrating is effected, the male turns about in order to reſt himſelf on his legs, and remains in that poſition till the parts turn flaccid. The female goes with young about nine weeks. They generally bring forth from ſix to twelve puppies. Thoſe of a ſmall ſize bring forth five, four, and ſometimes but two. They continue to copulate and bring forth during life, which laſts generally about fourteen or fifteen years. The whelps are commonly blind, and cannot open their eyes till the tenth or twelfth day; the males are like the dog, the females like the bitch.—The dog, the wolf, and the fox, are certainly derived from one original parent; and all dogs whatſoever, from the terrible boar-dog to Pompey the little, were all one in the firſt creation. All the variety we behold in them, is either produced by change of climate, or the accidental effect of ſoil, food, or ſituation; or from the iſſue of human care, experiment, or caprice. Every huntſman knows what a vaſt alteration may be made in dogs, by induſtriouſly improving the breed for twenty or thirty years. Nature wiſely tends to render every kind of creature fit for the country where it is to inhabit, or be employed; which is the reaſon why hounds, and all other animals, degenerate, by being removed into contrary climates. This is manifeſt from the following experiment: if a couple of right ſouthern hounds be removed to the north, and ſuffered to propagate without art or mixture, they will, by ſenſible degrees, decline into lighter bodies and ſhriller accents; and in the ſame way are all dogs varied, by being carried from one country to another. But the utmoſt efforts of human induſtry and contrivance, whether aſſiſted by change of climate, or mixture of breed, could never add one new ſpecies to the works of the creation. Nature is ſtill uniform as to the main, nor ſuffers the Almighty Creator to be imitated by ſhort-ſighted mortals. In ſpite of art, our mules are always barren; nor can the moſt curious projector produce one amphigeneous animal that will increaſe and multiply. There appears a diſtinct ſpecific difference in all living creatures; the horſe, the dog, the bear, the goat, however diverſified by art, by copulation, or by climate, either in ſize, ſhape, or figure, will ever diſcover ſomething that approximates to the character of their ſpecies. Above all, the peculiar inſtinct and appetite for generation, will prompt them to own and indicate their relation. Animals of different ſpecies will never copulate together. This is one of the moſt undeniable arguments that wolves, foxes, and dogs, are originally the ſame ſpecies, becauſe in coition they are not only all held together in the ſame manner, but we have ſome inſtances of litters of puppies produced from the dog and fox, and alſo from the dog and wolf. Mr. Brooke, animal-merchant in Holborn, turned a wolf to a Pomeranian bitch in heat;

the congreſs was immediate, and as uſual between dog and bitch: ſhe produced ten puppies. Mr. Pennant ſaw one of them at Gordon Caſtle, that had very much the reſemblance of a wolf, and alſo much of its nature; being ſlipped at a weak deer, it inſtantly caught at the animal's throat and killed it. I could not learn (ſays Mr. Pennant) whether this mongrel continued its ſpecies; but another of the ſame kind did, and ſtocked the neighbourhood of Fochabers, in the county of Moray, (where it was kept,) with a multitude of curs of a moſt wolfiſh aſpect. There was lately living a mongrel offspring of this kind. It greatly reſembled its wolf parent. It was firſt the property of Sir Wolſtein Dixey; afterwards of Sir Willoughby Aſton. During day it was very tame; but at night ſometimes relapſed into ferocity. It never barked, but rather howled; when it came into fields where ſheep were, it would feign lameneſs, but if no one was preſent would inſtantly attack them. It had been ſeen in copulation with a bitch, which afterwards pupped: the breed was imagined to reſemble in many reſpects the ſuppoſed ſire. It died between the age of five and ſix.—The woodman of the manor of Mongewell, in Oxfordſhire, has a bitch, which conſtantly follows him, the offspring a tame dog-fox by a ſhepherd's cur; and ſhe again has had puppies by a dog. Since there are ſuch authentic proofs of the further continuance of the breed, we may ſurely add the wolf and fox to the other ſuppoſed ſtocks of theſe faithful domeſtics, particularly as moſt naturaliſts ſuppoſe the dog to have been originally the production of one or other of theſe animals, tamed and civilized.

Many and wonderful are the inſtances of ſagacity, fidelity, and attention, and even of foreſight, which theſe faithful animals have evinced towards their maſters. Some ſuch will doubtleſs occur to the minds of my readers, as falling under their own obſervation; I ſhall therefore only recite two or three ſuch inſtances, of unqueſtionable authenticity.—In the year 1791, a perſon went to a houſe in Deptford, to take lodgings, under pretence than he was juſt arrived from the Weſt-Indies; and, after having agreed on terms, ſaid he ſhould ſend in his trunk that night, and come himſelf the next day. About nine o'clock in the evening, the trunk was brought in by two porters, and was carried into his bed-room. Juſt as the family were going to bed, their little houſe-dog, deſerting his uſual ſtation in the ſhop, placed himſelf cloſe to the door of the chamber where the cheſt was depoſited, and kept up an inceſſant barking. The moment the chamber door was opened, the dog flew to the cheſt, againſt which it barked and ſcratched with redoubled vehemence and fury. At firſt they tried to get the dog out of the room; but in vain. Calling in ſome neighbours, and making them eye-witneſſes of the circumſtance, they began to move the trunk about, when they quickly diſcovered that it contained ſomething alive. Suſpicion falling

falling very ſtrong, they were induced to open it, when, to their utter aſtoniſhment, who ſhould preſent himſelf but their new lodger, who had been thus conveyed in, to rob the houſe!—In the ſummer of the year 1792, a gentleman went down to Portſmouth for the benefit of ſea-bathing. He went to one of Mr. Bradley's machines, to be conducted into the water. Being unacquainted with the depth, and no ſwimmer, he found himſelf, the inſtant he quitted the machine, nearly out of his depth. Fright increaſed the peril of his ſituation, and, unnoticed by the perſon who attends the machines, he had ſunk for the laſt time in the agonies of drowning. A large Newfoundland dog, ſtanding by accident on the ſhore, and ſeeing the diſtreſs of this ſtranger, plunged in after him; and, ſeizing him by the hair of the head, conducted him ſafely on-ſhore, though it was ſome time before he recovered. The gentleman afterwards purchaſed the dog at a high price, but values him equally with the ſum total of his fortune.—At the ſeat of the late Earl of Litchfield, three miles from Blenheim, there is a portrait in the dining-room of Sir Henry Lee, by Johnſton, with that of a maſtiff dog which ſaved his life. It ſeems a ſervant had formed the deſign of aſſaſſinating his maſter and robbing the houſe; but the night he had fixed on, the dog, which had never been much noticed by Sir Henry, for the firſt time followed him up-ſtairs, got under his bed, and could not be driven thence by either maſter or man; in the dead of night, the ſame ſervant entered the room to execute his horrid deſign, but was inſtantly ſeized by the dog, and, being ſecured, confeſſed his intentions. There are ten quaint lines in one corner of the picture, which conclude thus:

> But in my dog, whereof I made no ſtore,
> I find more love than thoſe I truſted more.

Upon what hypotheſis can we account for a degree of foreſight and penetration ſuch as this? Or will it be ſuggeſted, as a ſolution of the difficulty, that a dog may poſſibly become capable in a great meaſure of underſtanding human diſcourſe, and of reaſoning and acting accordingly; and that, in the preſent inſtance, the villain had either uttered his deſign in ſoliloquy, or imparted it to an accomplice, in the hearing of the animal? It has been much diſputed whether brutes have any language whereby they can expreſs their minds to each other; or whether all the noiſe they make conſiſts only of cries inarticulate, and unintelligible even to themſelves. We may indeed, from analogy, conclude, with great reaſon, that ſome of the cries of beaſts are really expreſſions of their ſentiments; but whether one beaſt is capable of forming a deſign, and communicating that deſign by any kind of language to others, is what I ſhall leave to the judgment of the reader,

after ſubmitting to his conſideration the following inſtance.—A ſparrow, finding a neſt that a martin had juſt built, ſtanding very conveniently for him, poſſeſſed himſelf of it. The martin, ſeeing the uſurper in her houſe, called for help to expel him. A thouſand martins came full ſpeed, and attacked the ſparrow; but the latter, being covered on every ſide, and preſenting only his large beak at the entrance of the neſt, was invulnerable, and made the boldeſt of them who durſt approach him repent of their temerity. After a quarter of an hour's combat, all the martins diſappeared. The ſparrow thought he had got the better, and the ſpectators judged that the martins had abandoned their undertaking. Not in the leaſt. Immediately they returned to the charge; and, each of them having procured a little of that tempered earth with which they make their neſts, they all at once fell upon the ſparrow, and incloſed him in the neſt to periſh there, though they could not drive him thence. Can it be imagined that the martins could have been able to hatch and concert this deſign all of them together, without ſpeaking to each other, or without ſome medium of communication equivalent to language?

From all theſe extraordinary endowments, manifeſted by brute animals of different countries and kinds, ſome philoſophers have maintained that brutes are gifted with a ſoul, though eſſentially inferior to that of men; and to this ſoul they have allowed immortality. Father Bougeant, a Jeſuit, publiſhed, about the year 1740, a treatiſe expreſsly on this ſubject, entitled, *A Philoſophical Amuſement on the Language of Brutes*, in which he affirms that they are animated by evil ſpirits, or devils. The ſtrangeneſs of this doctrine has induced me to give the outline of his argument, ſince it cannot fail to prove entertaining to the reader. "Reaſon (ſays he) naturally inclines us to believe that beaſts have a ſpiritual ſoul; and the only thing that oppoſes this ſentiment is, the conſequences that might be inferred from it. If brutes have a ſoul, that ſoul muſt be either matter or ſpirit; it muſt be one of the two, and yet you dare affirm neither. You dare not ſay it is a matter, becauſe you muſt then neceſſarily ſuppoſe matter to be capable of thinking; nor will you ſay that it is ſpirit, this opinion bringing with it conſequences contrary to the principles of religion; and this, among others, that man would differ from beaſts only by the degrees of plus and minus; which would demoliſh the very foundation of all religion. Therefore, if I can elude all theſe conſequences; if I can aſſign to beaſts a ſpiritual ſoul, without ſtriking at the doctrines of religion; it is evident, that my ſyſtem, being moreover the moſt agreeable to reaſon, is the only warrantable hypotheſis. Now I ſhall, and can do it, with the greateſt eaſe imaginable. I even have means, by the ſame method, to explain many very obſcure paſſages in the Holy Scriptures, and to reſolve ſome very great difficulties which are not well confuted. This I ſhall unfold in a more particular manner. Religion teaches

us,

us, that the devils, from the very moment they had ſinned, were reprobate, and that they were doomed to burn for ever in hell; but the church has not yet determined whether they do actually endure the torments to which they are condemned. It may then be thought that they do not yet ſuffer them, and that the execution of the verdict brought againſt them is reſerved for the day of final judgement.—Now what I pretend to infer from hence is, that, till doomſday comes, God, in order not to ſuffer ſo many legions of reprobate ſpirits to be of no uſe, has diſtributed them through the ſeveral ſpaces of the world, to ſerve the deſigns of his Providence and make his omnipotence to appear. Some, continuing in their natural ſtate, buſy themſelves in tempting men, in ſeducing and tormenting them; either immediately, as Job's devil, and thoſe that lay hold of human bodies; or by the miniſtry of ſorcerers or phantoms. Theſe wicked ſpirits are thoſe whom the ſcripture calls the *powers of darkneſs*, or the *powers of the air*. God, with the others, makes millions of beaſts of all kinds, which ſerve for the uſes of men, which fill the univerſe, and cauſe the wiſdom and omnipotence of the Creator to be admired. By that means I can eaſily conceive, on the one hand, how the devils can tempt us; and, on the other, how beaſts can think, know, have ſentiments, and a ſpiritual ſoul, without any way ſtriking at the doctrines of religion. I am no longer ſurpriſed to ſee them have forecaſt, memory, and judgment. I ſhould rather have occaſion to wonder at their having no more, ſince their ſoul very likely is more perfect than ours. But I diſcover the reaſon of this: it is becauſe, in beaſts as well as in ourſelves, the operations of the mind are dependent on the material organs of the machine to which it is united; and, thoſe organs being groſſer and leſs perfect than in us, it follows, that the knowledge, the thoughts, and the other ſpiritual operations, of beaſts, muſt of courſe be leſs perfect than ours: and, if theſe proud ſpirits know their own diſmal ſtate, what an humiliation muſt it be to them thus to ſee themſelves reduced to the condition of beaſts! But whether they know it or no, ſo ſhameful a degradation is ſtill, with regard to them, the primary effect of the divine vengeance I juſt mentioned; it is an anticipated hell."—Having mentioned the prejudices againſt this hypotheſis, ſuch particularly as the pleaſure which people of ſenſe and religion take in beaſts and birds, eſpecially all ſorts of domeſtic animals; he proceeds, "Do we love beaſts for their own ſakes? No. As they are altogether ſtrangers to human ſociety, they can have no other appointment but that of being uſeful and amuſing. And what care we whether it be a devil or any other creature that amuſes us? The thought of it, far from ſhocking, pleaſes me mightily. I with gratitude admire the goodneſs of the Creator, who gave me ſo many little devils to ſerve and amuſe me. If I am told that theſe poor devils are doomed to ſuffer eternal tortures, I admire God's

decrees, but I have no manner of ſhare in that dreadful ſentence; I leave the execution of it to the Sovereign Judge; and, notwithſtanding this, I live with my little devils as I do with a multitude of people of whom religion informs me that a great number ſhall be damned. But the cure of a prejudice is not to be effected in a moment; it is done by time and reflection: give me leave then lightly to touch upon this difficulty, in order to obſerve a very important thing to you. Perſuaded as we are that beaſts have intelligence, have we not all of us a thouſand times pitied them for the exceſſive evils which the majority of them are expoſed to, and in reality ſuffer? How unhappy is the condition of horſes! we are apt to ſay, upon ſeeing a horſe whom an unmerciful carman is murdering with blows. How miſerable is a dog whom they are breaking for hunting! How diſmal is the fate of beaſts living in woods; they are perpetually expoſed to the injuries of the weather, always ſeized with apprehenſions of becoming the prey of hunters, or of ſome wilder animal; for ever obliged, after long fatigue, to look out for ſome poor inſipid food; often ſuffering cruel hunger; and ſubject, moreover, to illneſs and death! If men are ſubject to a multitude of miſeries that overwhelm them, religion acquaints us with the reaſon of it; viz. the being born ſinners. But what crimes can beaſts have committed by birth to be ſubject to evils ſo very cruel? What are we, then, to think of the horrible exceſſes of miſeries undergone by beaſts? miſeries, indeed, far greater than thoſe endured by men. This is, in any other ſyſtem, an incomprehenſible myſtery; whereas nothing is more eaſy to be conceived from the ſyſtem I propoſe. The rebellious ſpirits deſerve a puniſhment ſtill more rigorous, and happy is it for them that their puniſhment is deferred. In a word, God's goodneſs is vindicated, and man himſelf is juſtified: for what right can we have, without neceſſity, and often in the way of mere diverſion, to take away the life of millions of beaſts, if God had not authoriſed us ſo to do? And, beaſts being as ſenſible as ourſelves of pain and death, how could a juſt and merciful God have given man that privilege, if they were not ſo many guilty victims of the divine vengeance?—But hear ſtill ſomething more convincing, and of greater conſequence: beaſts, by nature, are extremely vicious. We know well that they never ſin, becauſe they are not free; but this is the only condition wanting to make them ſinners. The voracious birds and beaſts of prey are cruel. Many inſects of one and the ſame ſpecies devour one another. Cats are perfidious and ungrateful; monkeys are miſchievous; and dogs envious. All beaſts in general are jealous and revengeful to exceſs; not to mention many other vices we obſerve in them: and at the ſame time that they are by nature ſo very vicious, they have, ſay we, neither the liberty nor any helps to reſiſt the bias that hurries them into ſo many bad actions. They are, according to the ſchools, neceſſitated to do evil,

to

to diſconcert the general order, to commit whatever is moſt contrary to the notion we have of natural juſtice and to the principles of virtue. What monſters are theſe in a world originally created for order and juſtice to reign in? This is, in good part, what formerly perſuaded the Manicheans, that there were of neceſſity two orders of things, one good, and the other bad; and that the beaſts were not the work of the good principle: a monſtrous error! But how then ſhall we believe that beaſts came out of the hands of their Creator with qualities ſo very ſtrange! If man is ſo very wicked and corrupt, it is becauſe he has himſelf through ſin perverted the happy nature God had given him at his creation. Of two things, then, we muſt ſay one: either that God has taken delight in making beaſts ſo vicious as they are, and of giving us in them models of what is moſt ſhameful in the world; or that they have, like man, original ſin, which has perverted their primitive nature.—The firſt of theſe propoſitions finds very difficult acceſs to the mind, and is an expreſs contradiction to the Holy Scriptures; which ſay, that whatever came out of God's hands, at the time of the creation of the world, was good, yea very good. What good can there be in a monkey's being ſo very miſchievous, a dog ſo full of envy, a cat ſo malicious? But then many authors have pretended, that beaſts, before man's fall, were different from what they are now; and that it was in order to puniſh man that they became ſo wicked. But this opinion is a mere ſuppoſition, of which there is not the leaſt footſtep in holy ſcripture. It is a pitiful ſubterfuge to elude a real difficulty: this at moſt might be ſaid of the beaſts with whom man has a ſort of correſpondence; but not at all of the birds, fiſhes, and inſects, which have no manner of relation to him. We muſt then have recourſe to the ſecond propoſition, that the nature of beaſts has, like that of man, been corrupted by ſome original ſin: another hypotheſis, void of foundation, and equally inconſiſtent with reaſon and religion, in all the ſyſtems which have been hitherto eſpouſed concerning the ſouls of beaſts. What ſide are we to take? Why, admit of my ſyſtem, and all is explained. The ſouls of beaſts are refractory ſpirits which have made themſelves guilty towards God. The ſin in beaſts is no original ſin; it is a perſonal crime, which has corrupted and perverted their nature in its whole ſubſtance; hence all the vices and corruption we obſerve in them, though they can be no longer criminal, becauſe God, by irrecoverably reprobating them, has at the ſame time diveſted them of their liberty."

Theſe quotations contain the ſtrength of Father Bougeant's hypotheſis, which alſo hath had its followers; but the reply to it is obvious. Beaſts, though remarkably miſchievous, are not completely ſo; they are in many inſtances capable of gratitude and love, which devils cannot poſſibly be. The very ſame paſſions that are in the brutes exiſt in the human nature; and, if we choſe to argue from the

exiſtence of thoſe paſſions, and the aſcendency they have over mankind at ſome times, we may ſay, with as great juſtice, that the ſouls of men are devils, as that the ſouls of brutes are. All that can be reaſonably inferred from the greater prevalency of the malignant paſſions among the brutes than among men, is, that the former have leſs rationality than men: and accordingly it is found, that among ſavages, who exerciſe their reaſon leſs than other men, every ſpecies of barbarity is practiſed, without being deemed a crime.—Upon the whole, it is impoſſible to deduce this variety of action, in animals, from a general and uniform inſtinct only. For they accommodate their operations to times and circumſtances. They combine; they chooſe the favourable moment; they avail themſelves of the occaſion, and ſeem to receive inſtruction by experience. Many of their operations announce reflection: the bird repairs a ſhattered neſt, inſtead of conſtructing inſtinctively a new one: the hen, who has been robbed of her eggs, changes her place in order to lay the remainder with more ſecurity: the cat diſcovers both care and artifice in concealing her kittens. Again it is evident, that, on many occaſions, animals know their faults and miſtakes, and correct them; they ſometimes contrive the moſt ingenious methods of obtaining their ends, and when one method fails, have recourſe to another; and they have, without doubt, a kind of language for the mutual communication of their ideas. How is all this to be accounted for, unleſs we ſuppoſe them endowed with the powers of perceiving, thinking, remembering, comparing, and judging? They certainly have theſe powers, in a degree inferior to the human ſpecies, and form claſſes below them in the graduated ſcale of intelligent beings; but, their actions not being directed to moral ends, are conſequently not accountable and proper ſubjects for reward or puniſhment in a future world.

After all, it does not appear upon what principle of reaſon and juſtice it is, that mankind have founded their right over the *life* of every creature that is placed in a ſubordinate rank of being to themſelves. Whatever claim they may have in right of food and ſelf-defence, did they extend their privilege no farther, numberleſs beings might enjoy their lives in peace, who are now hurried out of them by the moſt wanton and unneceſſary cruelties. It is ſurely difficult to diſcover why it ſhould be thought leſs inhuman to cruſh to death a harmleſs inſect, whoſe ſingle offence is that he eats that food which nature has prepared for his ſuſtenance, than it would be were we to kill any bulky creature for the ſame reaſon. There are few tempers ſo hardened againſt the impreſſions of humanity, as not to ſhudder at the thought of the latter; and yet the former is univerſally practiſed, without the leaſt check of compaſſion. This ſeems to ariſe from the groſs error of ſuppoſing, that every creature is really in itſelf contemptible, which happens to be clothed with

with a body infinitely diſproportionate to our own, not conſidering that great and little are merely relative terms. But the inimitable Shakeſpeare would teach us, that

——the poor beetle that we tread upon,
In corp'ral ſuff'rance feels a pang as great
As when a giant dies.——

And, indeed, there is every reaſon to believe, that the ſenſations of many inſects are as requiſite as thoſe of creatures of far more enlarged dimenſions, perhaps even more ſo. The millepede, for inſtance, rolls itſelf round upon the ſlighteſt touch, and the ſnail gathers in her horns upon the leaſt approach of our hand. Are not theſe the ſtrongeſt indications of their ſenſibility? and is it any evidence of ours, that we are not therefore induced to treat them with a more ſympathiſing tenderneſs?

I cannot conclude theſe obſervations on the inſtinct and œconomy of brute animals, without reciting the following moſt remarkable account of the land-crab, which inhabits the Bahama Iſlands, as well as moſt parts between the tropics, and feeds upon vegetables. Theſe creatures live not only in a kind of orderly ſociety in their retreats in the mountains, but regularly, once a-year, march down to the ſea-ſide in a body of ſome millions at a time. As they multiply in great numbers, they chooſe the month of April or May to begin their expedition; and then ſally out by thouſands from the ſtumps of hollow trees, from the clefts of rocks, and from the holes which they dig for themſelves under the ſurface of the earth. At that time the whole ground is covered with this band of adventurers; there is no ſetting down one's foot without treading upon them. The ſea is their place of deſtination, and to that they direct their march with right-lined preciſion. No geometrician could ſend them to their deſtined ſtation by a ſhorter courſe; they turn neither to the right nor left, whatever obſtacles intervene; and, even if they meet with a houſe, they will attempt to ſcale the walls to keep the unbroken tenor of their way. But, though this be the general order of their route, they, upon other occaſions, are obliged to conform to the face of the country; and, if it is interſected with rivers, they are then ſeen to wind along the courſe of the ſtream. The proceſſion ſets forward from the mountains with the regularity of an army under the guidance of an experienced commander. They are commonly divided into three battalions; of which the firſt conſiſts of the ſtrongeſt and boldeſt males, that, like pioneers, march forward to clear the way, and face the greateſt dangers. Theſe are often obliged to halt for want of rain, and to go into the moſt convenient encampment till

the weather changes. The main body of the army is compoſed of females, which never leave the mountains till the rain has ſet in for ſome time, and then deſcend in regular battalia, being formed into two columns of fifty paces broad, and three miles deep, and ſo cloſe that they almoſt cover the ground. Three or four days after this, the rear guard follows, a ſtraggling undiſciplined tribe, conſiſting of males and females, but neither ſo robuſt nor ſo vigorous as the former. The night is their chief time of proceeding; but, if it rains by day, they do not fail to profit by the occaſion; and they continue to move forward in their ſlow uniform manner. When the ſun ſhines and is hot upon the ſurface of the ground, they then make an univerſal halt, and wait till the cool of the evening. When they are terrified, they march back in a confuſed diſorderly manner, holding up their nippers, with which they ſometimes tear off a piece of the ſkin, and then leave the weapon where they inflicted the wound. They even try to intimidate their enemies; for they often clatter their nippers together, as if it were to threaten thoſe that come to diſturb them. But, though they thus ſtrive to be formidable to man, they are much more ſo to each other; for they are poſſeſſed of one moſt unſocial property, which is, that, if any of them by accident is maimed in ſuch a manner as to be incapable of proceeding, the reſt fall upon and devour it on the ſpot, and then purſue their journey.—When, after a fatiguing march, and eſcaping a thouſand dangers, (for they are ſometimes three months in getting to the ſhore,) they have arrived at their deſtined port, they prepare to caſt their ſpawn. The peaſe are as yet within their bodies, and not excluded, as is uſual in animals of this kind, under the tail; for the creature waits for the benefit of ſea-water to help the delivery. For this purpoſe the crab has no ſooner reached the ſhore, than it eagerly goes to the edge of the water, and lets the waves waſh over its body two or three times. This ſeems only a preparation for bringing their ſpawn to maturity; for, without further delay, they withdraw to ſeek a lodging upon land. In the mean time the ſpawn grows larger, is excluded out of the body, and ſticks to the barbs under the flap, or more properly the tail. This bunch is ſeen as big as a hen's egg, and exactly reſembling the roes of herrings. In this ſtate of pregnancy they once more ſeek the ſhore for the laſt time; and, ſhaking off their ſpawn into the water, leave accident to bring it to maturity. At this time whole ſhoals of hungry fiſh are at the ſhore in expectation of this annual ſupply; the ſea to a great diſtance ſeems black with them; and about two thirds of the crabs' eggs are immediately devoured by theſe rapacious invaders. The eggs that eſcape are hatched under the ſand; and, ſoon after, millions at a time of the little crabs are ſeen quitting the ſhore,

ſhore, and ſlowly travelling up to the mountains. The old ones, however, are not ſo active to return; they have become ſo feeble and lean, that they can hardly creep along, and the fleſh at that time changes its colour. The moſt of them, therefore, are obliged to continue in the flat parts of the country till they recover, making holes in the earth, which they cover at the mouth with leaves and dirt, ſo that no air may enter. There they throw off their old ſhells, which they leave, as it were, quite whole; the place where they opened on the belly being unſeen. At that time they are quite naked, and almoſt without motion for ſix days together, when they become ſo fat as to be delicious food. They have then under their ſtomachs four large white ſtones, which gradually decreaſe in proportion as the ſhell hardens, and, when they come to perfection, are not to be found. It is at that time that the animal is ſeen ſlowly making its way back; and all this is moſt commonly performed in the ſpace of ſix weeks.—This animal, when poſſeſſed of its retreats in the mountains, is impregnable; for only ſubſiſting on vegetables, it ſeldom ventures out; and, its habitation being in the moſt inacceſſible places, it remains for a great part of the ſeaſon in perfect ſecurity. It is only when impelled by the deſire of bringing forth its young, and when compelled to deſcend into the flat country, that it is taken. At that time the natives wait for its deſcent in eager expectation, and, deſtroy thouſands; but, diſregarding their bodies, they only ſeek for that ſmall ſpawn which lies on each ſide the ſtomach within the ſhell, of about the thickneſs of a man's thumb. They are much more valuable upon their return after they have caſt their ſhell; for, being covered with a ſkin reſembling ſoft parchment, almoſt every part except the ſtomach may be eaten. They are taken in the holes by feeling for them with an inſtrument; they are ſought after by night, when on their journey, by flambeaux. The inſtant the animal perceives itſelf attacked, it throws itſelf on its back, and with its claws pinches moſt terribly whatever it happens to faſten on. But the dexterous crab-catcher takes them by the hinder legs in ſuch a manner that the nippers cannot touch him, and thus he throws them into his bag. Sometimes alſo they are caught, when they take refuge in the bottoms of holes in rocks by the ſea-ſide, by clapping a ſtick to the mouth of the hole, which prevents their getting out; and then ſoon after, the tide coming, enters the hole, and the animal is found, upon its retiring, drowned in its retreat.—Theſe crabs are of various ſizes, the largeſt about ſix inches wide; they walk ſide-ways like the ſea-crab, and are ſhaped like them: ſome are black, ſome are yellow, ſome red, and others variegated with red, white, and yellow, mixed. Some of theſe are poiſonous; and ſeveral people have died of eating of the crabs, particularly of the black kind.

The

The light-coloured are reckon beſt; and, when full in fleſh, are very well taſted. In ſome of the ſugar-iſlands they are eaten without danger; and are no ſmall help to the negro ſlaves, who, on many of theſe iſlands, would fare very hard without them.

Of SCENT.

NOTHING more eminently demonſtrates the doctrine of atoms, than *ſcent*. It is an effluvium continually ariſing from the corpuſcles that iſſue out of all bodies; and, being impregnated with the peculiar ſtate and quality of the blood and juices of that particular animal from which they flow, occaſions the vaſt variety of ſmells or ſcents cognizable by the olfactory nerves, or organs of ſmelling. Hence the reaſon why one perſon differs from another in ſcent, and why a dog will trace the footſteps of his maſter for an hundred miles together, follow him into any houſe, church, or other building, and diſtinguiſh him from every other perſon, though ſurrounded by ten thouſand; and when the faithful animal has thus diligently ſought out and recognized his maſter, he is ſeldom willing even to truſt the evidence of his own eyes, until, with erected creſt, he has taken a few cordial ſniffs, to convince himſelf he is right. Hence alſo we perceive how a pack of hounds are enabled to purſue the hare, fox, ſtag, or any other animal they are trained to hunt, acroſs the ſcent, and amidſt the ſociety of others of the ſame ſpecies, without being diverted from the purſuit of that ſelf-ſame animal they had *firſt* on foot. And hence too we diſcover how it is poſſible for birds and beaſts of prey to be directed to their food at ſuch vaſt diſtances; for theſe corpuſcles, iſſuing from putrid bodies, and floating in the air, are carried by the wind to different quarters; and, ſtriking the olfactory nerves of whatever animals they meet in their way,* immediately conduct them to the ſpot. It matters not how much the effluvia may be gone off, ſo as enough remains to irritate the olfactory organ; for, whether it be bird or beaſt, they try the ſcent in all directions, till at length they diſcover that which is ſtronger and ſtronger in proportion as they proceed; and this nature has taught them to know is the direct and obvious road to their prey, and prevents them from following the contrary courſe, which is naturally weaker and weaker, and what in hunting is termed *heel*. This obſervation is confirmed by the increaſed eagerneſs we perceive in all animals, the nearer they approach the object of purſuit; as we ſee hounds and ſpaniels in hunting and

* It is by this means the ſmall-pox, meaſles, putrid fevers, and all epidemic complaints, are communicated, and the plague and peſtilence conveyed from one place to another.

ſhooting,

ſhooting, are the more earneſt, in proportion as the ſcent is recent, and as they draw nearer to the game. The ſame thing, amongſt quadrupeds, whether wild or domeſtic, directs the male to the female that is in ſeaſon for love; and hence we ſee the dog, the boar, the bull, and the ſtallion, when turned looſe, apply their noſtrils to the ambient air, and proceed accordingly. By the ſame medium the vermin which infeſt our dwellings know how to direct their operations, whether to undermine walls, eat through ſolid boards, croſs rivers, or climb ſpouts; which ſhows how much ſtronger the faculty of ſmelling is poſſeſſed by the brute ſpecies than by the human; wiſely ordained by nature, to enable them to ſeek their food, and propagate their ſpecies, but for which they would often periſh, or have long ſince become extinct.

There are wonderful inſtances of ſome animal carcaſes, which, though ſlaked with lime, and buried ten feet under ground, have ſent forth ſo ſtrong a ſcent as to have attracted dogs to the ſpot, that eagerly endeavoured to dig away the earth to get at them. And an inſtance happened only a few years ſince at Petersfield in Hampſhire, where an unfortunate female, having privately delivered herſelf of two children, went and buried them in a deep hole in an adjoining fi ; but within three days ſome dogs were attracted to the ſpot by the ſcent, dug them up, and partly devoured them before the ſhocking circumſtance was diſcovered. No wonder then a pack of hounds, which have caught the ſcent of a polecat or weaſel, will purſue them into the thickeſt foreſt, and aſſemble round the very tree up the trunk of which they have run for ſhelter; or that blood-hounds, as in times of old, ſhould trace out fugitives and robbers in ſubterraneous caverns, in trees, caves, or foreſts, or in clefts of inacceſſible rocks, of which inſtances are given by the moſt reputable hiſtorians. It is however to be remarked, that as all animals hunt for and purſue their prey by its ſcent, ſo they ſeem inſtinctively to know, that they themſelves are hunted and purſued by means of the ſcent iſſuing from their own bodies; but, as this ſubject admits of ſo much curious and occult ſpeculation, I ſhall give a few inſtances of the effects of ſcent upon different animals, and the ſenſe and ſagacity they diſplay in the management of it.— And firſt, of the hare.

The hare is naturally a timid animal, but emanates a very ſtrong ſcent. He ſleeps in his form or ſeat during the day; and feeds, copulates, &c. in the night. In a moon-light evening, a number of them are ſometimes ſeen ſporting together, leaping and purſuing each other: but the leaſt motion, the falling of a leaf, alarms them; and then they all run off ſeparately, each taking a different route. They are extremely ſwift in their motion, which is a kind of gallop, or a ſucceſſion of quick leaps. When purſued, they always take to the

higher grounds: as their fore feet are much ſhorter than the hind ones, they run with more eaſe up-hill than down-hill. The hare is endowed with all thoſe inſtincts which are neceſſary for his own preſervation. In winter he chooſes a form expoſed to the ſouth, and in ſummer to the north; and has a thouſand contrivances to elude the vigilance of his purſuers, and to cut off his ſcent from the hounds. If it be rainy, the hare uſually takes to the highways; and if ſhe come to the ſide of a young grove, or ſpring, ſhe ſeldom enters, but ſquats down till the hounds have over-ſhot her; and then ſhe will return the very way ſhe came, for fear of the wet and dew that hangs on the boughs.—When ſhe comes near brook-ſides and plaſhes, ſhe will make all her croſſings, doublings, and works. Some hares have been ſo crafty, that, as ſoon as they have heard the ſound of a horn, they would inſtantly ſtart out of their form, though it was at the diſtance of a quarter of a mile, and go and ſwim in ſome pool, and reſt upon ſome ruſh-bed in the midſt of it: and would not ſtir from thence till they have heard the ſound of the horn again, and then have ſtarted out, ſwimming to land, and have ſtood up before the hounds four hours before they could kill them, ſwimming and uſing all ſubtilties and croſſings in the water. Nay, ſuch is the natural craft and ſubtilty of the hare, that ſometimes after ſhe has been hunted three hours, ſhe will drive up a freſh hare, and ſquat in the ſame form herſelf. Others, having been hunted a conſiderable time, will creep under the door of a ſheep-cot, and hide themſelves among the ſheep; or, when they have been hard hunted, will run in among a flock of ſheep, and will by no means be gotten out from among them till the hounds are coupled up, and the ſheep driven into their pens. Some of them will take the ground like a rabbit, and run up a wall, and hide in the graſs on the top of it. Some hares will go up one ſide of the hedge and come down the other, the thickneſs of the hedge being the only diſtance between the courſes. A hare that has been ſorely hunted, has got upon a quickſet hedge, and run a good way upon the top thereof, and then leapt off upon the ground. And they will frequently betake themſelves to furze-buſhes, and will leap from one to the other, to cut off the ſcent, whereby the hounds are frequently in default.—In the ſpring-time or ſummer, a hare will not ſit in buſhes, becauſe they are frequently infeſted with piſmires, ſnakes, and adders; but will ſit in corn-fields and open places. In the winter-time they ſit near towns and villages, in tufts of thorns and brambles, eſpecially when the wind is northerly or ſoutherly.—It is remarkable that the hare, although ever ſo frequently purſued by the dogs, ſeldom leaves the place where ſhe was brought forth, or even the form in which ſhe uſually ſits. It is common to find them in the ſame place next day, after being long and keenly chaſed the day before. The females

are

are more groſs than the males, and have leſs ſtrength and agility; they are likewiſe more timid, and never allow the dogs to approach ſo near their form before riſing, as the males. They likewiſe practiſe more arts, and double more frequently than the males. The hare is diffuſed almoſt over every climate; and, notwithſtanding they are every where hunted, their ſpecies never diminiſhes. They are in a condition of propagating the firſt year of their lives; the females go with young about thirty days, and produce four or five at a time; and as ſoon as they have brought forth, they again admit the embraces of the male; ſo that they may be ſaid to be always pregnant. The eyes of the young are open at birth; the mother ſuckles them about twenty days, after which they ſeparate from her, and procure their own food. The young never go far from the place where they were brought forth; but ſtill they live ſolitary, and make forms about thirty paces diſtant from each other: thus, if a young hare be found any where, you may almoſt be certain of finding ſeveral others within a very ſmall diſtance.

The fecundity of the rabbit is ſtill greater than that of the hare. They will breed ſeven times in the year, and the female ſometimes brings eight young ones at a time. Suppoſing this to happen regularly for four years, the number of rabbits from a ſingle pair will amount to one million two hundred ſeventy-four thouſand eight hundred and forty.—They are in a condition for generating when ſix months old; and, like the hare, the female is almoſt conſtantly in ſeaſon; ſhe goes with young about thirty days, and brings forth from four to eight at a litter. A few days before littering, ſhe digs a hole in the earth, not in a ſtraight line, but in a zig-zag form: the bottom of this hole ſhe enlarges every way, and then pulls off a great quantity of hair from her belly, of which ſhe makes a kind of bed for her young. During the two firſt days after birth, ſhe never leaves them but when preſſed with hunger, and then ſhe eats quickly and returns; and in this manner ſhe ſuckles and attends her young for ſix weeks. All this time both the hole and the young are concealed from the male: ſometimes, when the female goes out, ſhe, in order to deceive the male, fills up the mouth of the hole with earth, mixed with her own urine. But when the young ones begin to come to the mouth of the hole, and to eat ſuch herbs as the mother brings to them, the father ſeems to know them; he takes them betwixt his paws, ſmooths their hair, and careſſes them with great fondneſs.

The fox is eſteemed to be the moſt ſagacious and moſt crafty of all beaſts of prey. The former quality he ſhows in his method of providing himſelf with an aſylum, where he retires from preſſing dangers, where he dwells, and where he brings up his young: and his craftineſs is chiefly diſcovered by the ſchemes he falls upon in order to catch lambs, geeſe, hens, and all kinds of ſmall birds. The

fox

fox fixes his abode on the border of a wood, in the neighbourhood of cottages: he liſtens to the crowing of the cock, and the cries of the poultry. He ſcents them at a diſtance; he chooſes his time with judgment; he conceals his road as well as his deſign; he ſlips forward with caution, ſometimes even trailing his body, and ſeldom makes a fruitleſs expedition. In this manner he has been ſeen, on a moon-light night, enter a paſture where ſeveral hares were feeding, when lying down, and taking his tail in his mouth, he has trailed along like a rolling-ſtone, unſuſpected by his prey, till he had got too near for them all to eſcape. If he can leap the wall, or get in underneath, he ravages the court-yard, puts all to death, and then retires ſoftly with his prey, which he either hides under the herbage, or carries off to his kennel. He returns in a few minutes for another, which he carries off, or conceals in the ſame manner, but in a different place. In this way he proceeds till the progreſs of the ſun, or ſome movements perceived in the houſe, advertiſe him that it is time to ſuſpend his operations, and to retire to his den. He plays the ſame game with the catchers of thruſhes, wood-cocks, &c. He viſits the nets and bird-lime very early in the morning, carries off ſucceſſively the birds which are entangled, and lays them in different places, eſpecially near the ſides of highways, in the furrows, under the herbage or bruſhwood, where they ſometimes lie two or three days; but he knows perfectly where to find them when he is in need. He hunts the young hares in the plains, ſeizes old ones in their ſeats, never miſſes thoſe which are wounded, digs out the rabbits in the warrens, diſcovers the neſts of partridges and quails, ſeizes the mothers on the eggs, and deſtroys a vaſt quantity of game. The fox is exceedingly voracious; beſides fleſh of all kinds, he eats, with equal avidity, eggs, milk, cheeſe, fruits, and particularly grapes. When the young hares and partridges fail him, he makes war againſt rats, field-mice, ſerpents, lizards, toads, &c. Of theſe he deſtroys vaſt numbers; and this is the only ſervice he does to mankind. He is ſo fond of honey, that he attacks the wild bees, waſps, and hornets. They at firſt put him to flight by a thouſand ſtings; but he retires only for the purpoſe of rolling himſelf on the ground to cruſh them; and he returns ſo often to the charge, that he obliges them to abandon the hive, which he ſoon uncovers, and devours both the honey and wax. He will alſo devour fiſhes, lobſters, graſs-hoppers, &c. Foxes produce but once a-year; and the litter commonly conſiſts of four or five, ſeldom ſix, and never leſs than three. When the female is full, ſhe retires, and ſeldom goes out of her hole, where ſhe prepares a bed for her young. When ſhe perceives that her retreat is diſcovered, and that her young have been diſturbed, ſhe carries them off one by one, and goes in ſearch of another habitation. The fox, as well as the congenerous wolf, will produce with the dog kind, as noticed before.—The fox ſleeps ſound, and may be eaſily approached without awakening: he ſleeps in a round form, like the dog; but, when he only

repoſes

repoſes himſelf, he extends his hind legs, and lies on his belly. It is in this ſituation that he ſpies the birds along the hedges, and meditates ſchemes for catching them. The fox flies when he hears the exploſion of a gun, or ſmells gunpowder. Being exceedingly fond of grapes, he does much miſchief in vineyards.—When purſued by the hounds, he ſeldom fails to deceive and fatigue them, becauſe he purpoſely paſſes through the thickeſt parts of the foreſt or places of the moſt difficult acceſs, where the dogs are hardly able to follow him; and, when he takes to the plains, he runs ſtraight out, without ſtopping or doubling.—He is a great admirer of his own tail, with which he frequently amuſes and exerciſes himſelf, by running in circles to catch it: and, in cold weather, wraps it round his noſe. The ſmell of this animal is in general very ſtrong, but that of the urine is remarkably fetid. This ſeems ſo offenſive even to itſelf, that it will take the trouble of digging a hole in the ground, ſtretching its body at full length over it; and there, after depoſiting its water, covers it over with the earth, as the cat does its dung. The ſmell is ſo obnoxious, that it has often proved the means of the fox's eſcape from the dogs; who have ſo ſtrong an averſion at the filthy effluvia, as to avoid encountering the animal it came from. It is ſaid the fox makes uſe of its urine as an expedient to force the cleanly badger from its habitation: whether that be the means, is rather doubtful; but that the fox makes uſe of the badger's hole is certain; not through want of ability to form its own retreat, but to ſave itſelf ſome trouble; for, after the expulſion of the firſt inhabitant, the fox improves as well as enlarges it conſiderably, adding ſeveral chambers, and providently making ſeveral entrances to ſecure a retreat from every quarter. In warm weather, it will quit its habitation for the ſake of baſking in the ſun, or to enjoy the free air; but then it rarely lies expoſed, but chooſes ſome thick brake, that it may reſt ſecure from ſurpriſe. Crows, magpies, and other birds, who conſider the fox as their common enemy, will often, by their notes of anger, point out his retreat.

The ſtag or buck is the moſt crafty of all the ſpecies of deer. He conceals himſelf with great addreſs, is moſt difficult to trace, and derives ſuperior reſources from inſtinct; for, though he has the misfortune to leave behind him a ſtrong ſcent, which redoubles the ardour and appetite of the hounds, he knows how to withdraw himſelf from their purſuit, by the rapidity with which he begins his flight, and by his numerous doublings. He delays not his arts of defence till his ſtrength fails him; but, as ſoon as he finds that the firſt efforts of a rapid chace have been unſucceſsful, he repeatedly retraces his former ſteps; and after confounding, by theſe oppoſite movements, the direction he has taken, after intermixing the preſent with the paſt ſcent from his body, he riſes from the earth by a great bound, and, retiring to a ſide, he lies down flat on his belly, and in this immoveable

ſituation he allows the whole troop of his deceived enemies to paſs very near him. His laſt refuge, when ſorely hunted, is the ſoil, keeping the middle, fearing leſt, by touching a bough, or a ſhrub, he may give greater ſcent to the hounds. He always ſwims againſt the ſtream, and will often cover himſelf under water, ſo as to ſhow nothing but his noſe. Where opportunity of water fails, he will fly into herds of cattle, as cows, ſheep, &c. and will ſometimes leap on an ox, cow, or the like, that he may leave no ſcent on the ground. What is ſtill more remarkable, it is related by the principal huntſman of Louis XII. that a buck which they had hunted for a long time, being at laſt hard preſſed, leaped into the middle of a very large white-thorn, in order to cut off its ſcent; and there ſtood aloft till he was run through by the huntſman, rather than ſtir from the place to be worried by the dogs.—Their ſeaſon of love commences about the end of Auguſt or beginning of September, when they leave the coppice, return to the foreſts, and ſearch for the hinds. They cry with a loud voice; their neck and throat ſwell; they become extremely reſtleſs, and traverſe in open day the fields and the fallow grounds: they ſtrike their horns againſt the trees and hedges; in a word, they ſeem to be tranſported with fury, and run from country to country, till they find the hinds or females, whom they purſue and compel into compliance; for the female at firſt avoids and flies from the male, and never ſubmits to his embraces till ſhe is fatigued with the purſuit. The old hinds likewiſe come in ſeaſon before the younger ones. When two bucks approach the ſame hind, they muſt fight before they enjoy. If nearly equal in ſtrength, they threaten, paw the ground, ſet up terrible cries, and attack each other with ſuch fury, that they often inflict mortal wounds with the ſtrokes of their horns. The combat never terminates but in the defeat or flight of one of the rivals. The conqueror loſes not a moment in enjoying his victory, unleſs another rival approaches, whom he is again obliged to attack and repel. The oldeſt ſtags are always maſters of the field; becauſe they are ſtronger and more furious than the young ones, who muſt wait patiently till their ſuperiors tire, and quit their miſtreſſes. Sometimes, however, the young ſtags accompliſh their purpoſe while the old ones are fighting, and, after a haſty gratification, fly off. The hinds prefer the old ſtags, not becauſe they are moſt courageous, but becauſe they are much more ardent. It has been alleged, that, attracted by the ſcent of the hinds, the ſtags in the rutting-ſeaſon throw themſelves into the ſea, and paſs from one iſland to another at the diſtance of ſeveral leagues. They leap ſtill more nimbly than they ſwim; for, when purſued, they eaſily clear a hedge or fence of ſix or ſeven feet high; and on all preſſing occaſions ſhow aſtoniſhing ſenſe and ſagacity.

The ſenſes of the wolf are likewiſe excellent, particularly his ſenſe of ſmelling, which often extends farther than his eye. The odour of carrion ſtrikes him at the diſtance

of

of more than a league. He likewiſe ſcents live animals very far, and hunts them a long time by following their track. When he iſſues from the wood, he never loſes the wind. He ſtops on the borders of the foreſt, ſmells on all ſides, and receives the corpuſcles of living or dead animals brought to him from a diſtance by the wind. Though he prefers living to dead animals, yet he devours the moſt putrid carcaſes. He is fond of human fleſh; and, if ſtronger, he would perhaps eat no other. Wolves have been known to follow armies, and to come in troops to the field of battle, where bodies are careleſsly interred, to tear them up, and to devour them with an inſatiable avidity; and, when once accuſtomed to human fleſh, they ever after attack men, prefer the ſhepherd to the flock, devour women, and carry off children. The wolf, unlike the dog, is an enemy to all ſociety, and keeps no company even with thoſe of his own ſpecies. When ſeveral wolves unite together, it is not a ſociety of peace, but of war; it is attended with tumult and dreadful howlings, and indicates an attack upon ſome large animal, as a ſtag, an ox, or a formidable maſtiff. This military expedition is no ſooner finiſhed, than they ſeparate, and each returns in ſilence to his ſolitude. There is even little intercourſe between the males and females: they feel the mutual attractions of love but once a-year, and never remain long together. The females come in ſeaſon in winter: many males follow the ſame female; and this aſſociation is more bloody than the former; for they growl, chace, fight, and tear one another, and often ſacrifice him that is preferred by the female. The female commonly flies a long time, fatigues her admirers, and retires, while they ſleep, with the moſt alert or favourite male. The wolves copulate like dogs, and have an oſſeous penis, ſurrounded with a ring, which ſwells and hinders them from ſeparating. When the females are about to bring forth, they ſearch for a concealed place in the inmoſt receſſes of the foreſt. The puppies come into the world blind, like dogs; the mother ſuckles them ſome weeks, and ſoon teaches them to eat fleſh, which ſhe prepares for them by tearing it into ſmall pieces. Some time after ſhe brings them field-mice, young hares, partridges, and live fowls. The young wolves begin by playing with theſe animals, and at laſt worry them; then the mother pulls off the feathers, tears them in pieces, and gives a part to each of her young. They never leave their den till the end of ſix weeks or two months. They then follow their mother, who leads them to drink in the hollow trunk of a tree, or in ſome neighbouring pool. She conducts them back to the den, or, when any danger is apprehended, obliges them to conceal themſelves elſewhere. Though, like other females, the ſhe-wolf is naturally more timid than the male, yet, when her young are attacked, ſhe defends them with intrepidity; ſhe loſes all ſenſe of danger, and becomes perfectly furious. She never leaves them till they are ſo ſtrong as to need no aſſiſtance or protection, and till they

they have acquired talents fit for rapine. The wolf has great ſtrength, eſpecially in the anterior parts of the body, in the muſcles of the neck, and jaws. He carries a ſheep in his mouth, and at the ſame time outruns the ſhepherds; ſo that he can only be ſtopped or deprived of his prey by dogs. His bite is cruel, and always more obſtinate in proportion to the ſmallneſs of the reſiſtance; for, when an animal can defend itſelf, he is cautious and circumſpect. He never fights but from neceſſity, and not from motives of courage. When wounded with a ball, he cries; and yet, when diſpatching him with bludgeons, he complains not. When he falls into a ſnare, he is ſo overcome with terror, that he may be either killed or taken alive without reſiſtance; he allows himſelf to be chained, muzzled, and led where you pleaſe, without exhibiting the leaſt ſymptom of reſentment or diſcontent. Wolves are now ſo rare in the populated part of America, that the inhabitants leave their ſheep the whole night unguarded; yet the government of Pennſylvania and New Jerſey did ſome years ago allow a reward of twenty ſhillings, and the laſt even thirty ſhillings, for the killing of a wolf. Tradition informed them what a ſcourge thoſe animals had been to the colonies; ſo they wiſely determined to prevent the like evil. In their infant ſtate, wolves came down in multitudes from the mountains, often attracted by the ſmell of the corpſes of hundreds of Indians who died of the ſmall-pox, brought among them by the Europeans: but the animals did not confine their inſults to the dead, but even devoured in their huts the ſick and dying ſavages.—Britain, a few centuries ago, was much infeſted by them. They were, as appears by Hollingſhead, very noxious to the flocks in Scotland in 1577; nor were they entirely extirpated till about 1680, when the laſt wolf fell by the hands of the famous Sir Owen Cameron. Edward I. iſſued out his royal mandate to Peter Corbet to ſuperintend and aſſiſt in the deſtruction of them in the ſeveral counties of Glouceſter, Worceſter, Hereford, Salop, and Stafford; and in the adjacent county of Derby, certain perſons at Wormhill held their lands by the duty of hunting and taking the wolves that infeſted the country, whence they were ſtiled *wolve-hunt.* To look back into the Saxon times, we find that in Athelſtan's reign wolves abounded ſo in Yorkſhire, that a retreat was built at Flixton in that county, "to defend paſſengers from the wolves, that they ſhould not be devoured by them;" and ſuch ravages did theſe animals make during winter, particularly in January, when the cold was ſevereſt, that the Saxons diſtinguiſhed that month by the name of the *wolf-month.*—At the Cape of Good Hope, there is a ſpecies called the tiger-wolf, which is poſſeſſed of the peculiar gift of being enabled, in ſome meaſure, to imitate the cries of other animals; by which means this arch-deceiver is ſometimes enabled to beguile and attract calves, foals, lambs, and other animals. Near ſome of the larger farms, where there is a great deal of cattle, this ravenous

beaſt is to be found almoſt every night; and at the ſame time frequently from one hour to another betraying itſelf by its howlings, gives the dogs the alarm. In this caſe the cunning of the wolves is ſo great, that a party of them, half flying and half defending themſelves, will decoy the whole pack of dogs to follow them to the diſtance of a gun-ſhot or more from the farm, with a view to give an opportunity to the reſt of the wolves to come out from their ambuſcade, and, without meeting with the leaſt reſiſtance, carry off booty ſufficient for themſelves and their fugitive brethren. The tiger-wolf, though a much larger and ſtronger animal, does not venture, without being driven to the utmoſt neceſſity, to meaſure its ſtrength with the common dog, which is certainly an evident proof of its cowardice. Notwithſtanding this, the Hottentots inform us, that it is ſtill within the memory of man, that the tiger-wolf was bold enough to ſteal upon them and moleſt them in their huts, particularly by carrying off their children. This, however, is now no longer the caſe; a circumſtance, perhaps, proceeding from the introduction of fire-arms into the country, an invention which, in theſe latter times, has cauſed this, as well as other wild beaſts, to ſtand in greater awe of man than it did formerly. I have heard the following ſtory of the tiger-wolf mentioned, which is laughable enough, though perhaps not quite ſo probable: "At a feaſt near the Cape one night, a trumpeter who had got his fill was carried out of doors, in order that he might cool himſelf, and get ſober again. The ſcent of him ſoon drew thither a tiger-wolf, which threw him on his back, and dragged him along as a corpſe, up towards Table-mountain. During this, however, the drunken muſician waked, enough in his ſenſes to know the danger of his ſituation, and to ſound the alarm with his trumpet, which he carried faſtened to his ſide. The wild beaſt, as may eaſily be ſuppoſed, was not leſs frightened in his turn." Any other beſides a trumpeter would in ſuch circumſtances have undoubtedly been no better than wolf's meat.

The jackal appears to have the gift of ſcent equal to a dog, of which it ſeems to be a wild ſpecies. They go in packs of forty, fifty, and even two hundred, and hunt like hounds in full cry from evening to morning. They deſtroy flocks and poultry, but in a leſs degree than the wolf or fox: ravage the ſtreets of villages and gardens near towns, and will even deſtroy children, if left unprotected. They will enter ſtables and outhouſes, and devour ſkins, or any thing made of that material. They will familiarly enter a tent, and ſteal whatſoever they find from the ſleeping traveller. In default of living prey, they will feed on roots and fruits; and even on the moſt infected carrion: they will greedily diſinter the dead, and devour putrid carcaſes. They attend caravans, and follow armies, in hopes that death will provide them a banquet. Their voice naturally is a howl. Barking, Mr. Pennant obſerves, is latently inherent; and in their ſtate of nature ſeldom exerted: but its different modi-

fications are adventitious, and expreſſive of the new paſſions and affections gained by a domeſtic ſtate. Their howlings and clamours in the night are dreadful, and ſo loud that people can ſcarcely hear one another ſpeak. Dellon ſays, their voice is like the cries of a great many children of different ages mixed together: when one begins to howl, the whole pack join in the cry. This animal is vulgarly called the Lion's Provider, from an opinion that it rouzes the prey for that quadruped. The fact is, every creature in the foreſt is ſet in motion by the fearful cries of the jackals; the lion, and other beaſts of rapine, by a ſort of inſtinct, attend to the chace, and lie in wait, to ſeize ſuch timid animals as betake themſelves to flight at the noiſe of this nightly pack.

From what has been ſtated, as well as from the contemplation of nature in general, it will appear, that there is an occult inſtinctive principle infuſed into the whole race of animal beings, whereby they are unerringly led on to the propagation and preſervation of their ſpecies; yet ſo as that no one ſhall become too numerous for the exiſtence of another, upon which they prey, or with which they live in a continual ſtate of warfare. We may likewiſe remark, that the more ſimilarity we diſcover among brutes, the more amicable we find them towards each other, becauſe the corpuſcles of their bodies have an agreement pleaſing to their ſenſitive faculty, without exciting the appetite; but for which the ſame ſpecies would inceſſantly devour each other, and the purpoſes of creation would be annihilated by the operation of its own works. Contrary however to ſuch a violation of order, we find the beaſts of the foreſt, and brute animals in general, prey by *antipathy* upon thoſe which are oppoſite or inimical in ſcent and ſpecies to themſelves; and aſſociate by *ſympathy* with thoſe of ſimilar and concordant qualities; but the moſt powerful effect of ſympathy is to be found between the male and female of one and the ſame claſs of beings; as we ſhall demonſtrate more ſatisfactorily and pleaſingly, in our conſiderations.

On MAN.

MAN is placed at the head of the animal creation, and is a being who feels, reflects, thinks, contrives, and acts; who has power of changing his place upon the earth at pleaſure; who poſſeſſes the faculty of communicating his thoughts by means of ſpeech; and who has dominion over all other creatures on the face of the globe. Animated and enlightened by a ray from the Divinity, he ſurpaſſes in dignity every material being. He ſpends leſs of his time in ſolitude than in ſociety, or in obedience to thoſe laws which he himſelf has framed.

The hiſtory of man is an object of attention highly intereſting, whether we conſider him in the different periods of his life, or take a view of the varieties of his ſpecies,

ſpecies, or examine the wonderful ſymmetry and conſtruction of his parts in the womb, or the more mature completion and organization of his body in perfect manhood.—I ſhall therefore attempt firſt to give a ſhort ſketch of him in theſe different points of view; and then, by conſidering the actions and paſſions of his mind, the infirmities of his nature, the affections of his heart, the objects of his purſuits, and the impreſſion of the celeſtial, elementary, and atmoſpherical, influx; of light, heat, colour, motion, magnetiſm, electricity, and the univerſal ſpirit of nature which acts upon his conſtitution; deduce thoſe obvious and inevitable cauſes that reſult from them, and which it ſhould be the care of every man to know, who would wiſh to diſcover the golden KEY to the occult operations of Nature, and to the ſecret of preſerving HEALTH and LONG LIFE.

Noſce teipſum, "Know thyſelf," is a precept worthy of the lawgiver of Athens: it has been called the firſt ſtep to wiſdom, and was formerly written in letters of gold in the temple of Diana. In purſuit of this important information, MAN may be contemplated in the following reſpects:

PHYSIOLOGICALLY,—as a frail machine, chiefly compoſed of nerves and fibres interwoven with each other. His moſt perfect ſtate is during youth; and he is endowed with faculties more numerous, and in higher perfection, than thoſe of all other animals. "Man, intended for exerciſing dominion over the whole animal creation, is ſent by Nature into the world naked, forlorn, and bewailing his lot; he is then unable to uſe his hands or feet, and is incapable of acquiring any kind of knowledge without inſtruction; he can neither [illegible] perform any action whatever by natural inſtinct:" *Pliny*.—"We may judge what kind of life is allotted to us by Nature, ſince it is ordained, as an omen, that we ſhould come weeping into the world:" *Seneca*.—"It is humiliating to the pride of man, to conſider the pitiable origin of this moſt arrogant of all the animals:" *Pliny*.

DIETETICALLY.—*Cura valetudinem*. Bodily health and tranquillity of mind are more to be deſired than all the riches, pomp, or glory, of a Cræſus, a Solomon, or an Alexander. Health is to be preſerved by moderation; it is deſtroyed by abſtinence, injured by a variety of delicacies, weakened by unuſual things, and ſtrengthened by the uſe of proper and accuſtomed fare. Man, learned in the pernicious art of cookery, is fond of many diſhes, rendered palatable by the injurious effects of fire, and by the baneful addition of wine. "Hunger is ſatisfied with a ſmall quantity of food, while luxury demands overabundance. Imagination requires vaſt ſupplies; while nature is contented with a moderate quantity of ordinary food, and is burthened by ſuperfluity:" *Seneca*.—According as thou liveſt, ſo ſhall thy life be enjoyed.

PATHO-

PATHOLOGICALLY.—*Memento mori!* The life of man reſembles a bubble ready to burſt; his fate is ſuſpended by a hair, and is dependent on the uncertain lapſe of time. "The earth contains nothing more frail than man:" *Homer.*—"Nothing is weaker than human life: to what dangers, and to how many diſeaſes, is it not expoſed! Hence the whole period of a man's life is but a ſpan: half of it is neceſſarily ſpent in a ſtate reſembling death; without including the years of infancy, wherein there is no judgment; or the period of old age, fertile in ſufferings, during which the ſenſes are blunted, the limbs become ſtiff, and the faculties of ſight and hearing, the powers of walking, and the teeth, the inſtruments of nouriſhment, fail before the reſt of the body:" *Pliny.*—"Thus a conſiderable part of death is ſuffered during life; and death poſſeſſes all that belonged to the times which are paſt. Finally, nature will ſpeedily recal and deſtroy all the beings which thou ſeeſt, and all that thy imagination can ſuppoſe to exiſt hereafter; for death calls equally upon all, whether they be good or whether they be evil:" *Seneca.*

NATURALLY.—*Innocui vivite, Numen adeſt!* Man, the prince of animated beings, who is a miracle of nature, and for whom all things on this earth were created, is a mimic animal, weeping, laughing, ſinging, ſpeaking; tractable, judicious, inquiſitive, and moſt wiſe; he is weak and naked, unprovided with natural weapons, expoſed to all the injuries of fortune, needful of aſſiſtance from others, of an anxious mind, ſolicitous of protection, continually complaining, changeable in temper, obſtinate in hope, and ſlow in the acquiſition of wiſdom. He deſpiſes the time which is paſt, abuſes that which is present, and lets his affections on the uncertain future; thus continually neglecting winged time, which, though infinitely precious, can never be recalled: for thus the beſt and readieſt time, in every age, flies on with miſerable mortals; ſome it ſummons to attend their daily and burthenſome labours; ſome it confines to luxurious inaction, pampered even to ſuffocation with ſuperfluities; ſome it ſolicits in the ever-reſtleſs paths of ambition; ſome it renders anxious for the acquiſition of wealth, and diſtreſſes by the poſſeſſion of the thing deſired; ſome it condemns to ſolitude, and others to have their doors continually crouded with viſitors; here one bewails the conduct of his children, there one grieves their loſs. Tears will ſooner fail us than their cauſes, which only oblivion can remove. "On every hand our evils overbalance our advantages; we are ſurrounded with dangers; we ruſh forwards into untried ſituations; we are enraged without having received provocation; like wild beaſts, we deſtroy thoſe we do not hate; we wiſh for favourable gales, which lead us only to deſtruction; the earth yawns wide, ready for our death:" *Seneca.*—"Other animals unite together againſt enemies of a kind different from their own, while man ſuffers moſt injuries from his own ſpecies:" *Pliny.*

POLI-

POLITICALLY.—*Eſto antiqua virtute et fide!* Man, inſtead of following that which is right, is ſubjected to the guidance of manifeſt error; this envelopes all his faculties under the thick veil of cuſtom, as ſoon as he is born; according to its dictates he is fed, educated, brought up, and directed in all things; and by its arbitrary rules his honeſty, fortitude, wiſdom, morality, and religion, are judged of; thus, governed by opinion, he lives conformably to cuſtom, inſtead of being guided by reaſon. Though ſent into the world a periſhable being, (for all are evidently born to ſuffer,) inſtead of endeavouring to ſecure thoſe things which are moſt advantageous and truly beneficial, he, infatuated by the ſmiles of fortune, anxiouſly collects her gaudy trifles for future enjoyment, and neglects her real benefits; he is driven to madneſs by envious ſnarlers; he perſecutes with hatred the truly religious for differing from himſelf in ſpeculative opinions; he excites numberleſs broils, not that he may do good, but for a purpoſe that even himſelf is ignorant of. He waſtes his precious and irrecoverable time in trifles; he thinks lightly of immortal and eternal concerns, while regulating the ſucceſſion of his poſterity; and perpetually entering on new projects, forgetful of his real condition, he builds palaces inſtead of preparing his grave; till at length, in the midſt of his ſchemes, death ſeizes him; and then, firſt opening his eyes, he perceives, O man! that all is deluſion. "Thus we live as if immortal, and firſt learn in death that we have to die:" *Seneca.*

MORALLY.—*Benefac et lætare!* Man is compoſed of an animated medullary ſubſtance, which prompts him to that which is right; and of a bodily frame liable to impreſſions which inſtigate him to the enjoyment of pleaſure. In his natural ſtate he is fooliſh, wanton, an inconſiderate follower of example, ambitious, profuſe, diſſatisfied, cunning, peeviſh, invidious, malicious, and covetous; by the influence of juſt morals he is transformed to be attentive, chaſte, conſiderate, modeſt, temperate, quiet, ſincere, mild, beneficent, grateful, and contented. "Sorrow, luxury, ambition, avarice, the deſire of life, and anxiety for the future, are common to all animals:" *Pliny.*

THEOLOGICALLY.—*Memento Creatoris tui!* Man, the ultimate purpoſe of creation, and maſterpiece of the works of Omnipotence, was placed on earth that he might contemplate its perfections; he was endowed with ſapient reaſon, and made capable of forming concluſions from the impreſſions of his ſenſes, that, from a conſideration of created objects he might know their Creator as the Almighty, the Infinite, the Omniſcient, the Eternal, God: that we may live morally under his governing care, it is requiſite that we have a thorough conviction of his exiſtence, and muſt have it ever in remembrance. "There are two things which lead to a knowledge of God; creation and revelation:" *Auguſtine.*—"God, therefore, may

be found out by the light of nature, but is only to be known by the aſſiſtance of doctrine:" *Tertullian.*—"Man alone has the ineſtimable privilege of contemplating the perfections of God, who is the author both of nature and of revelation:" *Ibid.*—"Learn that God has both ordered you to exiſt, and that you ſhould ſtudy to act that part properly which is alloted for you in life:" *Perſ.* Sat. iii. 71.

In the Syſtema Naturæ, MAN *(Homo)* is ranked as a diſtinct genus of the order *Primates* or "Chiefs," belonging to the *Mammalia* claſs of animals, or thoſe which nouriſh their young by means of lactiferous teats or paps. Of this genus he is the only ſpecies: and denominated *Sapiens*, as being endowed with wiſdom far ſuperior to, or rather in excluſion of, all other animals.—He *varies*, from climate, education, and habits; and the following varieties, excluſive of *wild men*, are enumerated by Linnæus.

Americans. "Of copper-coloured complexion, choleric conſtitution, and remarkably erect."—Their hair is black, lank, and coarſe; their noſtrils are wide; their features harſh, and the chin is ſcantily ſupplied with beard. Are obſtinate in their tempers, free and ſatisfied with their condition; and are regulated in all their proceedings by traditional cuſtoms.—Paint their ſkin with red ſtreaks.

Europeans. "Of fair complexion, ſanguine temperament, and brawny form." The hair is flowing, and of various ſhades of brown; the eyes are moſtly blue.—They are of gentle manners, acute in judgment, of quick invention, and governed by fixed laws.—Dreſs in cloſe veſtments.

Aſiatics. "Of ſooty complexion, melancholic temperament, and rigid fibre."—The hair is ſtrong, black, and lank; the eyes are dark brown. They are of grave, haughty, and covetous, manners; and are governed by opinions.—Dreſs in looſe garments.

Africans. "Of black complexion, phlegmatic temperament, and relaxed fibre." The hair is black and frizzly; the ſkin ſoft and ſilky; the noſe flat: the lips are thick; and the female has a natural apron, and long lax breaſts.—They are of crafty, indolent, and careleſs, diſpoſitions, and governed in their actions by caprice.—Anoint the ſkin with greaſe.

The following arrangement of the varieties in the human ſpecies is offered by Dr. Gmelin as more convenient than that of Linnæus:

a, White, *(Hom. albus.)* Formed by the rules of ſymmetrical elegance and beauty; or at leaſt what we conſider as ſuch.—This diviſion includes almoſt all the inhabitants of Europe; thoſe of Aſia on this ſide of the Oby, the Caſpian, Mount Imaus, and the Ganges; likewiſe the natives of the north of Africa, of Greenland, and the Eſquimaux.

b, Brown:

b, Brown: *(Hom. badius.)* Of a yellowiſh brown colour; has ſcanty hair, flat features, and ſmall eyes.—This variety takes in the whole inhabitants of Aſia not included in the preceding diviſion.

c, Black: *(Hom. niger.)* Of black complexion; frizzly hair, flat noſe, and thick lips.—The whole inhabitants of Africa, excepting thoſe of its more northern parts.

d, Copper-coloured: *(Hom. cupreus.)* The complexion of the ſkin reſembles the colour of copper not burniſhed.—The whole inhabitants of America, except the Greenlanders and Eſquimaux.

e, Tawny: *(Hom. fuſcus.)* Chiefly of a dark blackiſh-brown colour; having a broad noſe, and harſh coarſe ſtraight hair.—The inhabitants of the ſouthern iſlands, and of moſt of the Indian iſlands.

Monſters. Of theſe there are ſeveral varieties; the firſt and ſecond of which, in the following liſt, are occaſioned by peculiarity of climate, while the reſt are produced by artificial management. 1. *Alpini:* The inhabitants of the northern mountains: they are ſmall in ſtature, active, and timid in their diſpoſitions. 2. *Patagonici:* The Patagonians of South America; of vaſt ſize, and indolent in their manners. 3. *Monorchides:* The Hottentots; having one teſticle extirpated. 4. *Imberbes:* Moſt of the American nations; who eradicate their beards and the hair from every part of the body except the ſcalp. 5. *Macrocephali:* The Chineſe; who have their heads artificially forced into a conical form. 6. *Plagiocephali:* The Canadian Indians, who have the fore part of their heads flattened, when young, by compreſſion.

We have likewiſe the following account of monſters: *Homines feri;* deſcribed as walking on all-fours, as being dumb, and as covered with hair.—1. A youth found in Lithuania, in 1761, reſembling a bear. 2. A youth found in Heſſe, in 1544, reſembling a wolf. 3. A youth in Ireland reſembling a ſheep, *(Tulp. Obſ.* iv. 9.) 4. A youth in Bamberg reſembling an ox, *(Camerarius.)* 5. A wild youth found in 1724 in Hanover. 6. Wild boys found in 1719 in the Pyrenees. 7. A wild girl found in 1717 in Overyſel. 8. A wild girl found in 1631 in Champagne. 9. A wild lad found near Leyden, *(Boerhaave.)*—Theſe and other inſtances of wild men, their ſimilitudes, extraction, and generation, being foreign to the preſent ſubject, I ſhall treat largely of them in a future work on NATURAL HISTORY.*

Thoſe characters in the form of man by which he is diſtinguiſhed from brute animals, are reducible to two heads. The firſt is the ſtrength of the muſcles of the legs, by which the body is ſupported in a vertical poſition above them: the ſecond conſiſts in the articulation of the head with the neck by the middle of its baſe. We ſtand upright, bend our body, and walk, without thinking on the power by which we

* Since publiſhed at No. 17, Ave-Maria-Lane, St Paul's, in 14 vols. 8vo. See vol. i. of that work.

we are ſupported in theſe ſeveral poſitions. This power reſides chiefly in the muſcles which conſtitute the principal part of the calf of the leg. Their exertion is felt, and their motion is viſible externally, when we ſtand upright and bend our body backwards and forwards. This power is no leſs great when we walk even on an horizontal plane. In aſcending a height, the weight of the body is more ſenſibly felt than in deſcending. All theſe motions are natural to man. Other animals, on the contrary, when placed on their hind legs, are either incapable of performing them at all, or do it partially, with great difficulty, and for a very ſhort time. The *gibbon*, and the *jocko* or *ourang-outang*, are the animals moſt reſembling man in their conſtruction: they can ſtand upright with much leſs difficulty than other brutes; but the reſtraint they are under in this attitude plainly ſhows that it is not natural to them. The reaſon is, that the muſcles in the back part of the leg in the gibbon and the jocko are not, as in man, ſufficiently large to form a calf, and conſequently not ſufficiently ſtrong to ſupport the thighs and body in a vertical line, and to preſerve them in that poſture.—The attitudes proper to man, and to the animals, are pointed out by the different manners in which the head is articulated with the neck. The two points, by which the oſſeous part of the head is connected with the firſt vertebra of the neck, and on which every movement of the head is made with the greateſt facility, are placed at the edge of the great foramen of the occipital bone, which in man is ſituated near the centre of the baſe of the cranium, affords a paſſage for the medullary ſubſtance into the vertebræ, and determines the place of the articulation of the head with the neck. The body and neck being, according to the natural attitude, in a vertical direction, the head muſt be placed in equilibrium upon the vertebræ as upon a pivot or point of ſupport. The face is on a vertical line, almoſt parallel to that of the body and neck. The jaws, which are very ſhort compared with thoſe of moſt other animals, extend very little farther forwards than the forehead.—No animal has, like man, its hind legs as long as the body, neck, and head, taken together, meaſuring from the top of the head to the os pubis.—In the frame of the human body the principal parts are nearly the ſame with thoſe of other animals; but in the connection and form of the bones, there is as great a difference as in the attitudes proper to each. Were a man to aſſume the natural poſture of quadrupeds, and try to walk by the help of his hands and feet, he would find himſelf in a very unnatural ſituation; he could not move his feet and head but with the greateſt difficulty and pain; and, let him make what exertions he pleaſed, he would find it impoſſible to attain a ſteady and continued pace. The principal obſtacles he would meet with would ariſe from the ſtructure of the pelvis, the hands, the feet, and the head.—The plane of the great occipital foramen, which in man is almoſt horizontal, puts the head in a kind of equilibrium upon

the neck when we ſtand erect in our natural attitude; but, when we are in the attitude of quadrupeds, it prevents us from raiſing our head ſo as to look forwards, becauſe the movement of the head is ſtopped by the protuberance of the occiput, which then approaches too near the vertebræ of the neck.—In moſt animals, the foramen magnum of the occipital bone is ſituated at the back part of the head; the jaws are very long; the occiput has no protuberance beyond the aperture, the plane of which is in a vertical direction, or inclined a little forwards or backwards; ſo that the head is pendant, and joined to the neck by its poſterior part. This poſition of the head enables quadrupeds, though their bodies are in a horizontal direction, to preſent their muzzle forwards, and to raiſe it ſo as to reach above them, or to touch the earth with the extremity of their jaws when they bring their neck and head down to their feet. In the attitude of quadrupeds, man could touch the earth only with the fore part or the top of the head.—When man is ſtanding, his heel reſts upon the earth as well as the other parts of his foot; when he walks, it is the firſt part which touches the ground; man can ſtand on one foot: theſe are peculiarities in ſtructure and in the manner of moving which are not to be found in other animals. We may therefore conclude that man cannot be ranked in the claſs of quadrupeds. We may add, that in man the brain is much larger, and the jaws much ſhorter, than in any other animal. The brain, by its great extent, forms the protuberance of the occipital bone, the forehead, and all that part of the head which is above the ears. In animals, the brain is ſo ſmall, that moſt of them have no occiput, or the front is either wanting or little raiſed. In animals which have large foreheads, ſuch as the horſe, the ox, the elephant, &c. they are placed as low, and even lower, than the ears. Theſe animals likewiſe want the occiput, and the top of the head is of very ſmall extent. The jaws, which form the greateſt portion of the muzzle, are large in proportion to the ſmallneſs of the brain. The length of the muzzle varies in different animals: in ſolipede animals it is very long; it is ſhort in the ourang-outang; and in man it does not exiſt at all. No beard grows on the muzzle.

Anatomiſts have employed much pains in the ſtudy of the material part of man, and of that organization which determines his place in the animal creation. From tracing and combining his different external parts; from obſerving that his body is in ſome places covered with hair; that he can walk upon his hands and his feet at the ſame time, in the manner of quadrupeds; that, like certain animals which hold their food in their paws, he has two clavicles; that the female brings forth her young alive, and that her breaſts are ſupplied with milk; from theſe circumſtances we might be led to aſſign man a place in the claſs of viviparous quadrupeds. But, in truth, ſuch an arrangement would be defective, arbitrary, and abſurd. Man is

not a quadruped: of all the animals, he alone can ſupport himſelf continually, and without reſtraint, in an erect poſture; (that is, with his head and body in a vertical line upon his legs.) In this majeſtic and dignified attitude, he can change his place, ſurvey this earth which he inhabits, and turn his eyes towards the vault of heaven. By a noble and eaſy gait, he preſerves an equilibrium in the ſeveral parts of his body, and tranſports himſelf from one place to another with different degrees of celerity. To man alone nature has denied a covering; but ſtill he is her maſterpiece, the laſt work which came from the hands of the Almighty Artiſt, the ſovereign and the chief of animals, a world in miniature, the centre which connects the univerſe together. The form of his body, the organs whereof are conſtructed in ſuch a manner as to produce a much greater effect than thoſe of other animals, announces his power. Every thing demonſtrates the excellence of his nature, and the immenſe diſtance placed by the bounty of the Creator between man and beaſt. Man is a reaſonable being; brute animals are deprived of that noble faculty. The weakeſt and moſt ſtupid of the human race is able to manage the moſt ſagacious quadruped; he commands it, and makes it ſubſervient to his uſe. The operations of brutes are purely the effect of mechanical impulſe, and continue always the ſame; human works are varied without end, and infinitely diverſified in the manner of execution. The ſoul of man is free, independent, and immortal. He is fitted for the ſtudy of ſcience, and the cultivation of art; he has the excluſive privilege of examining every thing which has exiſtence, and of holding communication with his fellow-creatures by language, by particular motions of the body, and by marks and characters mutually agreed upon. Hence ariſes that phyſical pre-eminence which he enjoys over all animals; and hence that power which he poſſeſſes over the elements, and (ſo to ſpeak) over nature itſelf. Man, therefore, is unequalled in his kind; but the individuals thereof differ greatly from one another in figure, ſtature, colour, manners, and diſpoſitions. The globe which man inhabits is covered with the productions of his induſtry and the works of his hands: it is his labour, in ſhort, which gives a value to the whole terreſtrial maſs.

Nothing (ſays M. Buffon) exhibits ſuch a ſtriking picture of our weakneſs as the condition of an infant immediately after birth. Incapable of employing its organs, it needs aſſiſtance of every kind. In the firſt moments of our exiſtence, we preſent an image of pain and miſery, and are more weak and helpleſs than the young of any other animal. At birth, the infant paſſes from one element to another: when it leaves the gentle warmth of the tranquil fluid by which it was completely ſurrounded in the womb of the mother, it becomes expoſed to the impreſſions of the air, and inſtantly feels the effects of that active element. The air acting upon the olfactory nerves, and upon the organs of reſpiration, produces a

ſhock ſomething like ſneezing, by which the breaſt is expanded, and air is admitted into the lungs. In the mean time, the agitation of the diaphragm preſſes upon the viſcera of the abdomen, and the excrements are thus for the firſt time diſcharged from the inteſtines, and the urine from the bladder. The air dilates the veſicles of the lungs, and, after being rarefied to a certain degree, is expelled by the ſpring of the dilated fibres re-acting upon this rarefied fluid. The infant now reſpires; and articulates ſounds, or cries.—Moſt animals are blind for ſome days after birth: infants open their eyes to the light the moment they come into the world; but they are dull, fixed, and commonly blue. The new-born child cannot diſtinguiſh objects, becauſe he is incapable of fixing his eyes upon them. The organ of viſion is yet imperfect; the cornea is wrinkled; and perhaps the retina is too ſoft for receiving the images of external objects, and for communicating the ſenſation of diſtinct viſion. At the end of forty days, the infant begins to hear and to ſmile. About the ſame time it begins to look at bright objects, and frequently to turn its eyes towards the window, a candle, or any light. Now likewiſe it begins to weep; for its former cries and groans were not accompanied with tears. Smiles and tears are the effect of two internal ſenſations, both of which depend on the action of the mind. Thus they are peculiar to the human race, and ſerve to expreſs mental pain or pleaſure; while the cries, motions, and other marks of bodily pain and pleaſure, are common to man and moſt of the other animals. Conſidering the ſubject as metaphyſicians, we ſhall find that pain and pleaſure are the univerſal power which ſets all our paſſions in motion.

The ſize of an infant born at the full time is commonly twenty-one inches; and that *fœtus*, which nine months before was an imperceptible bubble, now weighs ten or twelve pounds, and ſometimes more. The head is large in proportion to the body; and this diſproportion, which is ſtill greater in the firſt ſtage of the fœtus, continues during the period of infancy. The ſkin of a new-born child is of a reddiſh colour, becauſe it is ſo fine and tranſparent as to allow a ſlight tint of the colour of the blood to ſhine through. The form of the body and members is by no means perfect in a child ſoon after birth; all the parts appear to be ſwollen. At the end of three days, a kind of jaundice generally comes on, and at the ſame time milk is to be found in the breaſts of the infant, which may be ſqueezed out by the fingers. The ſwelling decreaſes as the child grows up.

The liquor contained in the amnios leaves a viſcid whitiſh matter upon the body of the child. In this country we have the precaution to waſh the new-born infant only with warm water; but it is the cuſtom with whole nations, inhabiting the coldeſt climates, to plunge their infants into cold water as ſoon as they are born, without their receiving the leaſt injury. It is even ſaid that the Laplanders leave

their

their children in the ſnow till the cold has almoſt ſtopped their reſpiration, and then plunge them into a warm bath. Among theſe people, the children are alſo waſhed thrice a-day during the firſt year of their life. The inhabitants of northern countries are perſuaded that the cold bath tends to make men ſtronger and more robuſt, and on that account accuſtom their children to the uſe of it from their infancy. The truth is, that we are totally ignorant of the power of habit, or how far it can make our bodies capable of ſuffering, of acquiring, or of loſing.

The child is not allowed to ſuck as ſoon as it is born; but time is given for diſcharging the liquor and ſlime from the ſtomach, and the *meconium* or excrement, which is of a black colour, from the inteſtines. As theſe ſubſtances might ſour the milk, a little diluted wine mixed with ſugar is firſt given to the infant; and the breaſt is not preſented to it before ten or twelve hours have elapſed.

The young of quadrupeds can of themſelves find the way to the teat of the mother: it is not ſo with man; the mother, in order to ſuckle her child, muſt raiſe it to her breaſt; and, at this feeble period of life, the infant can expreſs its wants only by its cries.

New-born children have need of frequent nouriſhment. During the day, the breaſt ought to be given to them every two hours, and during the night as often as they wake. At firſt they ſleep almoſt continually; and they ſeem never to wake but when preſſed by hunger or pain. Sleep is uſeful and refreſhing to them; and it ſometimes becomes neceſſary to employ narcotic doſes, proportioned to the age and conſtitution of the child, for the purpoſe of procuring them repoſe. The common way of appeaſing the cries of children is by rocking them in the cradle; but this agitation ſhould be very gentle, otherwiſe a great riſk is run of confuſing the infant's brain, and of producing a total derangement. It is neceſſary to their being in good health, that their ſleep be long and natural. It is poſſible, however, that they may ſleep too much, and thereby endanger their conſtitution. In that caſe, it would be proper to take them out of the cradle, and awaken them by a gentle motion, or by preſenting ſome bright object to their eyes. At this age we receive the firſt impreſſions from the ſenſes, which, without doubt, are more important during the reſt of life than is generally imagined. Great care ought to be taken to place the cradle in ſuch a manner that the child ſhall be directly oppoſite to the light: for the eyes are always directed towards that part of the room where the light is ſtrongeſt: and, if the cradle be placed ſideways, one of them, by turning towards the light, will acquire greater ſtrength than the other, and the child will ſquint. For the two firſt months, no other food ſhould be given to the child but the milk of the nurſe; and, when it is of a weak and delicate conſtitution, this nouriſhment alone ſhould be continued during the third or fourth month. A child, however

however robuſt and healthful, may be expoſed to great danger and inconvenience, if any other aliment is adminiſtered before the end of the firſt month. In Holland, Italy, Turkey, and the whole Levant, the food of children is limited to the milk of the nurſe for a whole year. The ſavages of Canada give their children ſuck for four, five, and ſometimes even ſeven, years. In this country, as nurſes generally have not a ſufficient quantity of milk to ſatisfy the appetite of their children, they commonly ſupply the want of it by panada, or other light preparations.

The teeth uſually begin to appear about the age of ſeven months. The cutting of theſe, although a natural operation, does not follow the common laws of nature, which act continually on the human body without occaſioning the ſmalleſt pain, or even producing any ſenſation. Here a violent and painful effort is made, accompanied with cries and tears. Children at firſt loſe their ſprightlineſs and gaiety; they become ſad, reſtleſs, and fretful. The gums are red, and ſwelled; but they afterwards become white, when the preſſure of the teeth is ſo great as to ſtop the circulation of the blood. Children apply their fingers to their mouth, that they may remove the irritation which they feel there. Some relief is given, by putting into their hands a bit of ivory or of coral, or of ſome other hard and ſmooth body, with which they rub the gums at the affected part. This preſſure, being oppoſed to that of the teeth, calms the pain for a moment, contributes to make the membrane of the gum thinner, and facilitates its rupture. Nature here acts in oppoſition to herſelf; and an inciſion of the gum muſt ſometimes take place, to allow a paſſage to the tooth.

When children are allowed to cry too long and too often, ruptures are ſometimes occaſioned by the efforts they make. Theſe may eaſily be cured by the ſpeedy application of bandages; but, if this remedy has been too long delayed, the diſeaſe may continue through life. Children are very much ſubject to worms. Some of the bad effects occaſioned by theſe animals might be prevented by giving them a little wine now and then, for fermented liquors have a tendency to prevent their generation.

Though the body is very delicate in the ſtate of infancy, it is then leſs ſenſible of cold than at any other part of life. The internal heat appears to be greater: the pulſe in children is much greater than in adults; from which we are certainly intitled to infer, that the internal heat is greater in the ſame proportion. For the ſame reaſon, it is evident that ſmall animals have more heat than large ones; for the beating of the heart and of the arteries is always quicker in proportion to the ſmallneſs of the animal. The ſtrokes of the heart in a ſparrow ſucceed one another ſo rapidly, that they can ſcarcely be counted.

Till three years of age, the life of a child is very precarious. In the two or three following years, it becomes more certain; and at ſix or ſeven years of age, a child has a better chance of living than at any other period of life. From the bills of mortality publiſhed in London, it appears, that, of a certain number of children born at the ſame time, one half of them die the three firſt years: according to which, one half of the human race are cut off before they are three years of age. But the mortality among children is not near ſo great every-where as in London. M. Dupré de Saint Maur, from a great number of obſervations made in France, has ſhown that half of the children born at the ſame time are not extinct till ſeven or eight years have elapſed.

The period of infancy is followed by that of adoleſcence. This begins, together with puberty, at the age of twelve or fourteen, and commonly ends in girls at ſixteen; and in boys at eighteen, but ſometimes not till twenty-one, twenty-three, or twenty-five, years of age. According to its etymology (being derived from the Latin word *adoleſcentia*,) it is completed when the body has attained its full height. Thus, puberty accompanies adoleſcence, and precedes youth. This is the ſpring of life; this is the ſeaſon of pleaſures, of loves, and of graces: but alas! this ſmiling ſeaſon is of ſhort duration. Hitherto nature ſeems to have had nothing in view but the preſervation and increaſe of her work: ſhe has made no proviſion for the infant except what is neceſſary to its life and growth. It has lived, or rather enjoyed a kind of vegetable exiſtence, which was ſhut up within itſelf, and which it was incapable of communicating. In this firſt ſtage of life, reaſon is ſtill aſleep: but the principles of life ſoon multiply; and man has not only what is neceſſary to his own exiſtence, but what enables him to give exiſtence to others. This redundancy of life, this ſource of health and vigour, can no longer be confined, but endeavours to diffuſe and expand itſelf.

The age of puberty is announced by ſeveral marks. The firſt ſymptom is a kind of numbneſs and ſtiffneſs in the groins, accompanied with a new and peculiar ſenſation in thoſe parts which diſtinguiſh the ſexes. There, as well as in the arm-pits, ſmall protuberances of a whitiſh colour appear, which are the germs of a new production, of a kind of hair by which theſe parts are afterwards to be veiled. The voice, for a conſiderable time, is rough and unequal; after which it becomes fuller, ſtronger, and graver, than it was before. This change may eaſily be diſtinguiſhed in boys; but leſs ſo in girls, becauſe their voices are naturally ſharper. Theſe marks of puberty are common to both ſexes: but there are marks peculiar to each, ſuch as the diſcharge of the menſes and growth of the breaſts, in girls; the beard, and the emiſſion of ſemen, in boys: in ſhort, the feeling of venereal deſire, and the appetite which unites the ſexes. Among all races of mankind, the females

females arrive at puberty ſooner than the males; but the age of puberty is different in different nations, and ſeems partly to depend on the temperature of the climate and the quality of the food. In all the ſouthern countries of Europe, and in cities, the greateſt part of girls arrive at puberty about twelve, and boys about fourteen, years of age. But in the northern parts, and in the country, girls ſcarcely arrive at puberty till they are fourteen or fifteen, and boys not till they are ſixteen or ſeventeen. In our climate, girls, for the greateſt part, have attained complete maturity at eighteen, and boys at twenty, years of age.

At the age of adoleſcence, and of puberty, the body commonly attains its full height. About that time, young people ſhoot out ſeveral inches almoſt at once. But there is no part of the human body which increaſes more quickly and more perceptibly than the organs of generation in both ſexes. In males, this growth is nothing but an unfolding of the parts, an augmentation in ſize; but in females, it often occaſions a ſhrinking and contraction, which have received different names from thoſe who have treated of the ſigns of virginity.

Marriage is a ſtate ſuitable to man, wherein he muſt make uſe of thoſe new faculties which he has acquired by puberty. At this period of life, the deſire of producing a being like himſelf is ſtrongly felt. The external form and the correſpondence of the organs of ſex occaſion without doubt that irreſiſtible attraction which unites the ſexes and perpetuates the race. By connecting pleaſure with the propagation of the ſpecies, nature has provided moſt effectually for the continuance of her work. *Increaſe and multiply* is the expreſs command of the Creator, and one of the natural functions of life. We may add, that at the age of puberty a thouſand impreſſions act upon the nervous ſyſtem, and reduce man to ſuch a ſituation, that he feels his exiſtence only in that voluptuous ſenſe, which then appears to become the ſeat of his ſoul, which engroſſes the whole ſenſibility of which he is ſuſceptible, and which at length proceeds to ſuch a height, that its attacks cannot long be ſupported without a general derangement of the whole machine. The continuance of ſuch a feeling may ſometimes indeed prove fatal to thoſe who indulge in exceſſive enjoyment; but it is equally dangerous to thoſe who obſtinately perſiſt in celibacy, eſpecially when ſtrongly ſolicited by nature to the contrary. The ſemen, being too long confined in the ſeminal veſſels, may, by its ſtimulant property, occaſion diſeaſes in both ſexes, and excite irritations ſo violent as to reduce man to a level with the brutes, which, when acted upon by ſuch impreſſions, are perfectly furious and ungovernable. When this irritation proceeds to extremity, it produces what is called the *furor uterinus* in women. The oppoſite habit, however, is infinitely more common, eſpecially in the temperate, and above all in the frozen, zones. After all, exceſs is much more to be dreaded than continency.

nency. The number of diſſolute and intemperate men afford us plenty of examples. Some have loſt their memory, ſome have been deprived of ſight, many have become early bald, and ſome have died, through mere weakneſs. In ſuch a caſe, bleeding is well known to be fatal. Young men cannot be too often warned of the irreparable injury they may do to their health; and parents, to whoſe care they are entruſted, ought to employ all the means in their power to turn them from ſuch dangerous exceſſes. But at the age of puberty, young men know not of how great importance it is to prolong this ſmiling ſeaſon of their days, whereon the happineſs or miſery of their future life ſo much depends. Then they look not forward to futurity, nor reflect on what is paſt, nor enjoy preſent pleaſures with moderation. How many ceaſe to be men, or at leaſt to have the faculties of men, before the age of thirty? Nature muſt not be forced: like a true mother, her object is the ſober and diſcreet union of the ſexes. It is ſufficient to obey when ſhe commands, and to anſwer when ſhe calls. Neither muſt we forget here to mention and condemn an outrage committed againſt nature, the ſhameful practice of which endangers the loſs of health, and the total ruin of the conſtitution; I mean that ſolitary libertiniſm, ſo extenſively explained in the Medical Part of my edition of Culpeper, by which a man or woman, deceiving nature as it were, endeavours to procure thoſe enjoyments which religion has forbidden except when connected with the happineſs of being a parent. Such then is the phyſical order which the Author of Nature, the great preſerver of the ſpecies as well as the individual, has appointed to induce man, by the attraction of pleaſure, to propagate and continue his race.

According to the ordinary courſe of nature, women are not fit for conception till after the firſt appearance of the menſes. When theſe ſtop, which generally happens about forty or fifty years of age, they are barren ever after. Their breaſts then ſhrink and decay, and the voice becomes feebler. Some, however, have become mothers before they have experienced any menſtrual diſcharge; and others have conceived at the age of ſixty, and ſometimes at a more advanced age. Such examples, though not unfrequent, muſt be conſidered as exceptions to the general rule; but they are ſufficient to ſhow that the menſtrual diſcharge is not abſolutely eſſential to generation. The age at which man acquires the faculty of procreating is not ſo diſtinctly marked. In order to the production of ſemen, the body muſt have attained a certain growth, which generally happens between twelve and eighteen years of age. At ſixty or ſeventy, when the body begins to be enervated by old age, the voice becomes weaker, the ſemen is ſecreted in ſmaller quantities, and it is often unprolific. There are inſtances, however, of old men who have procreated at the age of eighty or ninety. Boys have been found who had the faculty of generating

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at nine, ten, or eleven, years of age; and young girls who have become pregnant at the age of ſeven, eight, or nine. But ſuch facts, which are very rare, ought to be conſidered as extraordinary phænomena in the courſe of nature.

At the age of puberty, or a few years after, the body attains its full ſtature. Some young men grow no taller after fifteen or ſixteen, and others continue to grow till the age of twenty or twenty-three. At this period they are very ſlender; but by degrees the members ſwell and begin to aſſume their proper ſhape; and, before the age of thirty, the body in men has attained its greateſt perfection with regard to ſtrength, conſiſtence, and ſymmetry Adoleſcence ends at the age of twenty or twenty-five; and at this period youth (according to the diviſion which has been made of the years of man's life into different ages) begins. It continues till the age of thirty or thirty-five.

The common ſtature of man is about five feet and three, four, five, ſix, or ſeven, inches; and of women about five feet and two, three, and four, inches. Men below five feet are of a ſmall ſtature. The Laplanders do not exceed four feet and a half; and the natives of ſome other countries are ſtill ſmaller. Women attain their full height ſooner than men. Haller computes, that, in the temperate climates of Europe, the medium ſtature of men is about five feet and five or ſix inches. It is obſerved by the ſame author, that in Swiſſerland the inhabitants of the plains are taller than thoſe of the mountains. It is difficult to aſcertain with preciſion the actual limits of the human ſtature. In ſurveying the inhabited earth, we find greater differences in the ſtatures of individuals than in thoſe of nations. In the ſame climate, among the ſame people, and ſometimes in the ſame family, there are men whoſe ſtature is either too tall or too diminutive.—The body, having acquired its full height during the period of adoleſcence, and its full dimenſions in youth, remains for ſome years in the ſame ſtate before it begins to decay. This is the period of manhood, which extends from the age of thirty or thirty-five to that of forty or forty-five years. During this ſtage, the powers of the body continue in full vigour, and the principal change which takes place in the human figure ariſes from the formation of fat in different parts. Exceſſive fatneſs diſfigures the body, and becomes a very cumberſome and inconvenient load.

The body of a well-ſhaped man ought to be ſquare, the muſcles ought to be ſtrongly marked, the contour of the members boldly delineated, and the features of the face well defined. In women, all the parts are more rounded and ſofter, the features are more delicate, and the complexion brighter. To man belong ſtrength and majeſty; gracefulneſs and beauty are the portion of the other ſex.—Every thing in both ſexes points them out as the ſovereigns of the earth; even the external appearance of man declares his ſuperiority to other living creatures. His body

is erect; his attitude is that of command; his auguſt countenance, which is turned towards heaven, bears the impreſſion of his dignity. The image of his ſoul is painted in his face; the excellence of his nature pierces through the material organs, and gives a fire and animation to the features of his countenance. His majeſtic deportment, his firm and emboldened gait, announce the nobleneſs of his rank. He touches the earth only with his extremity; he views it only at a diſtance, and ſeems to deſpiſe it. It has been juſtly obſerved, that the countenance of man is the mirror of his mind. In the looks of no animal are the expreſſions of paſſion painted with ſuch energy and rapidity, and with ſuch gentle gradations and ſhades, as in thoſe of man. We know, that in certain emotions of the mind, the blood riſes to the face, and produces bluſhing; and that in others the countenance turns pale. Theſe two ſymptoms, the appearance of which depends on the ſtructure and tranſparency of the reticulum, eſpecially redneſs, conſtitute a peculiar beauty. In our climates, the natural colour of the face of a man in good health is white, with a lively red ſuffuſed upon the cheeks. Paleneſs of the countenance is always a ſuſpicious ſymptom. That colour which is ſhaded with black is a ſign of melancholy and of vitiated bile; and conſtant and univerſal redneſs is a proof that the blood is carried with too great impetuoſity to the brain. A livid colour is a morbid and dangerous ſymptom; and that which has a tint of yellow is a ſign of jaundice or repletion of bile. The colour of the ſkin is frequently altered by want of ſleep or of nouriſhment, or by looſeneſs and diarrhœa.

Notwithſtanding the general ſimilitude of countenance in nations and families, there is a wonderful diverſity of features. No one, however, is at a loſs to recollect the perſon to whom he intends to ſpeak, provided he has once fully ſeen him. One man has livelineſs and gaiety painted in his countenance, and announces beforehand, by the cheerfulneſs of his appearance, the character which he is to ſupport in ſociety. The tears which bedew the cheeks of another man would excite compaſſion in the moſt unfeeling heart. Thus the face of man is the rendezvous of the ſymptoms both of his moral and phyſical affections; tranquillity, anger, threatening, joy, ſmiles, laughter, malice, love, envy, jealouſy, pride, contempt, diſdain or indignation, irony, arrogance, tears, terror, aſtoniſhment, horror, fear, ſhame or humiliation, ſorrow and affliction, compaſſion, meditation, particular convulſions, ſleep, death, &c. &c. The difference of theſe characters is of ſufficient importance to form a principal article in the natural hiſtory of man.

When the mind is at eaſe, all the features of the face are in a ſtate of profound tranquillity. Their proportion, harmony, and union, point out the ſerenity of the thoughts. But, when the ſoul is agitated, the human face becomes a living canvaſs, whereon the paſſions are repreſented with equal delicacy and energy, where every

emotion of the ſoul is expreſſed by ſome feature, and every action by ſome mark; the lively impreſſion of which anticipates the will, and reveals by pathetic ſigns our ſecret agitation, and thoſe intentions which we are anxious to conceal. It is particularly in the eyes that the ſoul is painted in the ſtrongeſt colours and with the moſt delicate ſhades.

The different colours of the eyes are, dark hazel, light hazel, green, blue, grey, and whitiſh-grey. The moſt common of theſe colours are hazel and blue, both of which are often found in the ſame eye. Eyes which are commonly called black are only dark hazel; they appear black in conſequence of being contraſted with the white of the eye. Wherever there is a tint of blue, however ſlight, it becomes the prevailing colour, and outſhines the hazel, with which it is intermixed, to ſuch a degree, that the mixture cannot be perceived without a very narrow examination. The moſt beautiful eyes are thoſe which appear black or blue. In the former, there is more expreſſion and vivacity; in the latter, more ſweetneſs and perhaps delicacy. Next to the eyes, the parts of the face by which the phyſiognomy is moſt ſtrongly marked are the eye-brows. Being of a different nature from the other parts, their effect is increaſed by contraſt. They are like a ſhade in a picture, which gives relief to the other colours and forms.

The forehead is one of the largeſt parts of the face, and contributes moſt to its beauty. Every body knows of how great importance the hair is in the phyſiognomy, and that baldneſs is a very great defect. When old age begins to make its approaches, the hair which firſt falls off is that which covers the crown of the head and the parts above the temples. We ſeldom ſee the hair of the lower part of the temples, or of the back of the head, completely fall of. Baldneſs is peculiar to men; women do not naturally loſe their hair, though it becomes white, as well as that of men, at the approach of old age.

The noſe is the moſt prominent feature of the face; but, as it has very little motion, and that only in the moſt violent paſſions, it contributes leſs to the expreſſion than to the beauty of the countenance. The noſe is ſeldom perpendicular to the middle of the face, but for the moſt part is turned to one ſide or the other. The cauſe of this irregularity, which, according to the painters, is perfectly conſiſtent with beauty, and of which even the want would be a deformity, appears to be frequent preſſure on one ſide of the cartilage of the child's noſe againſt the breaſt of the mother when it receives ſuck. At this early period of life, the cartilages and bones have acquired very little ſolidity, and are eaſily bent, as may be obſerved in the legs and thighs of ſome individuals, who have been injured by the bandages of the ſwaddling clothes.

Next to the eyes, the mouth and lips have the greateſt motion and expreſſion. Theſe motions are under the influence of the paſſions. The mouth, which is ſet off by the vermilion of the lips and the enamel of the teeth, marks, by the various forms which it aſſumes, their different characters. The organ of the voice likewiſe gives animation to this feature, and communicates to it more life and expreſſion than is poſſeſſed by any of the reſt. The cheeks are uniform features, and have no motion or expreſſion excepting from that involuntary redneſs or paleneſs with which they are covered in different paſſions; ſuch as ſhame, anger, pride, and joy, on the one hand; and fear, terror, and ſorrow, on the other.

In different paſſions, the whole head aſſumes different poſitions, and is affected with different motions. It hangs forward during ſhame, humility, and ſorrow; it inclines to one ſide in languor and compaſſion; it is elevated in pride; erect and fixed in obſtinacy and ſelf-conceit; in aſtoniſhment it is thrown backwards; and it moves from ſide to ſide in contempt, ridicule, anger, and indignation.—In grief, joy, love, ſhame, and compaſſion, the eyes ſwell and the tears flow. The effuſion of tears is always accompanied with an extenſion of the muſcles of the face, which opens the mouth.—In ſorrow, the corners of the mouth are depreſſed, the under lip riſes, the eye-lids fall down, the pupil of the eye is raiſed and half concealed by the eye-lid. The other muſcles of the face are relaxed, ſo that the diſtance between the eyes and the mouth is greater than ordinary; and conſequently the countenance appears to be lengthened.—In fear, terror, conſternation, and horror, the forehead is wrinkled, the eye-brows are raiſed, the eye-lids are opened as wide as poſſible, the upper lid uncovers a part of the white above the pupil, which is depreſſed and partly concealed by the under lid. At the ſame time, the mouth opens wide, the lips recede from each other, and diſcover the teeth both above and below.—In contempt and deriſion, the upper lip is raiſed at one ſide and expoſes the teeth, while the other ſide of the lip moves a little, and wears the appearance of a ſmile. The noſtril on the elevated ſide of the lip ſhrivels up, and the corner of the mouth falls down. The eye on the ſame ſide is almoſt ſhut, while the other is open as uſual; but the pupils of both are depreſſed, as when one looks down from a height.—In jealouſy, envy, and malice, the eye-brows fall down and are wrinkled; the eye-lids are elevated, and the pupils are depreſſed. The upper lip is elevated on both ſides, while the corners of the mouth are a little depreſſed, and the under lip riſes to join the middle of the upper.—In laughter, the corners of the mouth are drawn back and a little elevated; the upper part of the cheeks riſe; the eyes are more or leſs cloſed; the upper lip riſes, and the under one falls down; the mouth opens; and, in caſes of immoderate laughter, the ſkin of the noſe wrinkles. That gentler and more gracious kind of laughter which is called *ſmiling*, is ſeated wholly

wholly in the parts of the mouth. The under lip riſes; the angles of the mouth are drawn back; the cheeks are puffed up; the eye-lids approach one another; and a ſmall twinkling is obſerved in the eyes. It is very extraordinary, that laughter may be excited either by a moral cauſe without the immediate action of external objects, or by a particular irritation of the nerves without any feeling of joy. Thus an involuntary laugh is excited by a ſlight tickling of the lips, of the palm of the hand, of the ſole of the foot, of the arm-pits, and below the middle of the ribs. We laugh when two diſſimilar ideas, the union of which was unexpected, are preſented to the mind at the ſame time; and when one or both of theſe ideas, or their union, include ſome abſurdity which excites an emotion of diſdain mingled with joy. In general, ſtriking contraſts never fail to produce laughter.—A change is produced in the features of the countenance by weeping as well as by laughing. When we weep, the under lip is ſeparated from the teeth, the forehead is wrinkled, the eye-brows are depreſſed, the dimple, which gives a gracefulneſs to laughter, forſakes the cheek; the eyes are more compreſſed, and almoſt conſtantly bathed in tears, which in laughter flow more ſeldom and leſs copiouſly.

The arms, hands, and every part of the body, contribute to the expreſſion of the paſſions. In joy, for inſtance, all the members of the body are agitated with quick and various motions. In languor and ſorrow, the arms hang down, and the whole body remains fixed and immoveable. In admiration and ſurpriſe, this total ſuſpenſion of motion is likewiſe obſerved. In love, deſire, and hope, the head and eyes are raiſed to heaven, and ſeem to ſolicit the wiſhed-for good; the body leans forward, as if to approach it; the arms are ſtretched out, and ſeem to ſeize beforehand the beloved object. On the contrary, in fear, hatred, and horror, the arms ſeem to puſh backward and repel the object of our averſion; we turn away our head and eyes as if to avoid the ſight of it; we recoil in order to ſhun it.

Although the human body is externally much more delicate than that of any other animal, yet it is very nervous, and perhaps ſtronger in proportion to its ſize than that of the ſtrongeſt animals. We are aſſured that the porters at Conſtantinople carry burdens of nine hundred pounds weight, yet drink nothing but water. A thouſand wonderful ſtories are related of the Hottentots and other ſavages, concerning their agility in running. Civilized man knows not the full extent of his powers, nor how much he loſes by that effeminacy and inactivity by which they are weakened and deſtroyed. He is contented even to be ignorant of the ſtrength and vigour which his members are capable of acquiring by motion, and by being accuſtomed to ſevere exerciſes, as is obſerved in runners, tumblers, and rope-dancers. The concluſion is, therefore, founded on the moſt juſt and indiſputable induction and

analogy.—The attitude of walking is leſs fatiguing to man than that in which he is placed when he is ſtopped in running. Every time he ſets his foot upon the ground, he paſſes over a more conſiderable ſpace; the body leans forward, and the arms follow the ſame direction; the reſpiration increaſes, and breathing becomes difficult. Leaping begins with great inflexions of the members; the body is then much ſhortened, but immediately ſtretches itſelf out with a great effort. The motions which accompany leaping make it very fatiguing.

It is obſerved that a ceſſation from exerciſe is not alone ſufficient to reſtore the powers of the body when they are exhauſted by fatigue. The ſprings, though not in action, are ſtill wound up while we are awake, even when every movement is ſuſpended. In *ſleep* nature finds that repoſe which is ſuited to her wants; and the different organs enjoy a ſalutary relaxation. This is that wonderful ſtate in which man, unconſcious of his own exiſtence, and ſunk in apparent death, repairs the loſs which his faculties have ſuſtained, and ſeems to aſſume a new exiſtence. In this ſtate of drowſineſs and repoſe, the ſenſes ceaſe to act, the functions of the body are ſuſpended, and it ſeems abandoned to itſelf. The external ſymptoms of ſleep, which alone are the objects of our attention, are eaſily diſtinguiſhed. At the approach of ſleep, the eyes begin to wink, the eye-lids fall down, the head nods and hangs down: its fall aſtoniſhes the ſleeper; he ſtarts up, and makes an effort to drive away ſleep, but in vain; a new inclination, ſtronger than the former, deprives him of the power of raiſing his head; his chin reſts upon his breaſt, and in this poſition he enjoys a tranquil ſleep.

The age of decline extends from forty or forty-five to ſixty or ſixty-five years of age. At this time of life, the diminution of the fat is the cauſe of thoſe wrinkles which begin to appear in the face and ſome other parts of the body. The ſkin, not being ſupported by the ſame quantity of fat, and being incapable, from want of elaſticity, of contracting, ſinks down and forms folds. In the decline of life, a remarkable change takes place alſo in viſion. In the vigour of our days, the cryſtalline lens, being thicker and more diaphanous than the humours of the eye, enables us to read letters of a ſmall character at the diſtance of eight or ten inches. But, when the age of decline comes on, the quantity of the humours of the eye diminiſhes, they loſe their clearneſs, and the tranſparent cornea becomes leſs convex. To remedy this inconvenience, we place what we wiſh to read at a greater diſtance from the eye: but viſion is thereby very little improved, becauſe the image of the object becomes ſmaller and more obſcure. Another mark of the decline of life is a weakneſs of the ſtomach, and indigeſtion, in moſt people who do not take ſufficient exerciſe in proportion to the quantity and the quality of their food.—At ſixty, ſixty-three, or ſixty-five, years of age, the ſigns of decline become more and more

viſible, and indicate *old age*. This period commonly extends to the age of ſeventy, ſometimes to ſeventy-five, but ſeldom to eighty. When the body is extenuated and bent by old age, man then becomes *crazy*. Crazineſs therefore is nothing but an *infirm old age*. The eyes and ſtomach then become weaker and weaker; leanneſs increaſes the number of the wrinkles; the beard and the hair become white; the ſtrength and the memory begin to fail.—After ſeventy, or at-moſt eighty years of age, the life of man is nothing but labour and ſorrow: ſuch was the language of David near three thouſand years ago. Some men of ſtrong conſtitutions, and in good health, enjoy old age for a long time without decrepitude; but ſuch inſtances are not very common. The infirmities of decrepitude continually increaſe, and at length death concludes the whole. This fatal term is uncertain. The only concluſions which we can form concerning the duration of life, muſt be derived from obſervations made on a great number of men who were born at the ſame time, and who died at different ages.

The ſigns of *decrepitude* form a ſtriking picture of weakneſs, and announce the approaching diſſolution of the body. The memory totally fails; the nerves become hard and blunted; deafneſs and blindneſs take place; the ſenſes of ſmell, of touch, and of taſte, are deſtroyed; the appetite fails; the neceſſity of eating, and more frequently that of drinking, are alone felt; after the teeth fall out, maſtication is imperfectly performed, and digeſtion is very bad; the lips fall inwards; the edges of the jaws can no longer approach one another; the muſcles of the lower jaw become ſo weak, that they are unable to raiſe and ſupport it; the body ſinks down; the ſpine is bent outward; and the vertebræ grow together at the anterior part; the body becomes extremely lean: the ſtrength fails: the decrepid wretch is unable to ſupport himſelf; he is obliged to remain on a ſeat, or ſtretched in his bed: the bladder becomes paralytic; the inteſtines loſe their ſpring; the circulation of the blood becomes ſlower; the ſtrokes of the pulſe no longer amount to the number of eighty in a minute, as in the vigour of life, but are reduced to twenty-four, and ſometimes fewer: reſpiration is ſlower; the body loſes its heat; the circulation of the blood ceaſes; death follows; and the dream of life is no more.

Man, however, has no right to complain of the ſhortneſs of life. Throughout the whole of living beings, there are few who unite in a greater degree all the internal cauſes which tend to prolong its different periods. The term of geſtation is very conſiderable; the rudiments of the teeth are very late in unfolding; his growth is ſlow, and is not completed before about twenty years have elapſed.—The age of puberty, alſo, is much later in man than in any other animal. In ſhort, the parts of his body, being compoſed of a ſofter and more flexible ſubſtance, are not

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ſo ſoon hardened as thoſe of inferior animals. Man, therefore, ſeems to receive at his birth the ſeeds of a long life: if he reaches not the diſtant period which nature ſeemed to promiſe him, it muſt be owing to accidental or acquired cauſes, foreign to himſelf. Inſtead of ſaying that he has finiſhed his life, we ought rather to ſay that he has not completed it.—The natural and total duration of life is in ſome meaſure proportioned to the period of growth. A tree or an animal, which ſoon acquires its full ſize, decays much ſooner than another which continues to grow for a longer time. If it be true that the life of animals is eight times longer than the period of their growth, we might conclude that the boundaries of human life may be extended to a century and a half.

It does not appear that the life of man becomes ſhorter in proportion to the length of time the world has exiſted. In the days of the Pſalmiſt, the ordinary limits of human life did not exceed ſeventy or eighty years. No king of Judah lived beyond that period. When the Romans, however, were numbered by Veſpaſian, there were found in the empire, in that age of effeminacy, ten men aged an hundred and twenty and upwards. Among the princes of modern times, Frederic the Great of Pruſſia lived to the age of 74. George II. of Britain lived to that of 77. Louis XIV. lived to the ſame age. Staniſlaus King of Poland and Duke of Lorrain exceeded that age. Pope Clement XII. lived to the age of 80. George I. of Britain attained the age of 83. William Lecomte, a ſhepherd, died ſuddenly in 1776, in the county of Caux in Normandy, at the age of 110. Cramers, phyſician to the emperor, ſaw at Temeſwar two brothers, the one aged 110 and the other 112, both of whom were fathers at that age. Saint Paul the hermit was 113 at his death. The Sieur Iſwan-Horwaths, knight of the order of St. Louis, died at Sar-Albe in Lorraine, in 1775, aged almoſt 111; he was a great hunter; he undertook a long journey a ſhort time before his death, and performed it on horſeback. Roſine Iwiwarouſka died at Minſk in Lithuania at the age of 113. Fockjel Johannes died at Oldeborn in Frieſland, aged 113 years and 16 days. Marſk Jones died in the year 1775 at Villejac in Hungary, aged 119. John Niethen of Bakler in Zealand lived to the age of 120. Eleonora Spicer died in 1773, at Accomack in Virginia, aged 121. John Argus was born in the village of Laſtua in Turkey, and died the 6th of March 1779, at the age of 123; having ſix ſons and three daughters, by whom he had poſterity to the fifth generation; they amounted to the number of 160 ſouls, and all lived in the ſame village: his father died at the age of 120. In December 1777, there lived in Devonſhire a farmer named John Brookey, who was 134 years of age, and had been fifteen times married. The Philoſophical Tranſactions mention an Engliſhman, of the name of Eccleſton, who lived to the age of 143. Another Engliſhman, of the name of Effingham, died in 1757, at the

the age of 144. Niels Jukens, of Hammerfet in Denmark, died in 1764, aged 146. Chriſtian Jacob Drakemberg died in 1770 at Archuſen, in the 146th year of his age: this old man of the north was born at Stavangar in Norway in 1624, and at the age of 130 married a widow of 60. In Norway ſome men have lived to the age of 150. John Rovin, who was born at Szatlova-Carantz-Betcher, in the bannat of Temeſwar, lived to the age of 172, and his wife to that of 164, having been married to him during the ſpace of 147 years: when Rovin died, their youngeſt ſon was 99 years of age. Peter Zoten, a peaſant, and a countryman of John Rovin, died in 1724, at the age of 185: his youngeſt ſon was then 97 years of age. The hiſtory and whole-length pictures of John Rovin, Henry Jenkins, and Peter Zoten, are to be ſeen in the library of H. R. H. Prince Charles at Bruſſels. Hanovins, profeſſor at Dantzic, mentions in his Nomenclature an old man who died at the age of 184; and another ſtill alive in Wallachia, whoſe age, according to this author, amounted to 186. Thomas Parr, of Shropſhire, died November 16, 1635, aged 152. Henry Jenkins, of Yorkſhire, died December 8, 1670, aged 169. Robert Montgomery, of Yorkſhire, died in 1670, aged 196. James Sands, of Staffordſhire, aged 140, and his wife, 120. The Counteſs of Deſmond, of Ireland, aged 140. J. Sagar, of Lancaſhire, died in 1668, aged 112. —— Laurence, of Scotland, aged 140. Simon Sack, of Trionia, died May 30, 1764, aged 141. Col. Thomas Winſlow, of Ireland, died Auguſt 26, 1766, aged 146. Francis Conſiſt, of Yorkſhire, died in January 1768, aged 150. Margaret Forſter, aged 136, and her daughter, aged 104, of Cumberland, were both living in 1771. Francis Bons, of France, died Feb. 6, 1769, aged 121. James Bowels, of Killingworth, aged 152. John Tice, of Worceſterſhire, died March 1774, aged 125. John Mount, of Scotland, died Feb. 27, 1766, aged 136. A. Goldſmith, of France, died in June 1776, aged 140. Mary Yates, of Shropſhire, died in 1776, aged 128. John Bales, of Northampton, died April 5, 1766, aged 126. William Ellis, of Liverpool, died Auguſt 16, 1780, aged 130. Louiſa Truxo, a negreſs of Tucomea, South America, was living October 5, 1780, aged 175. Margaret Patten, of Lockneugh near Paiſley, aged 138. Janet Taylor, of Fintray, Scotland, died October 10, 1780, aged 108. Richard Lloyd, of Montgomery, aged 133. Suſannah Hilliar, of Piddington, Northamptonſhire, died Feb. 19, 1781, aged 110. Ann Cockbolt, of Stoke-Bruerne, Northamptonſhire, died April 5, 1775, aged 105. James Ayley, of Middlewich, Cheſhire, died March 17, 1781, aged 112. William Walker, who was a ſoldier at the battle of Edgehill, lived to the age of 112. Hippocrates, phyſician, of the iſland of Cos, aged 104. Democritus, philoſopher, of Abdera, aged 109. Galen, phyſician, of Pergamus, aged 140. Albuna Marc, of Ethiopia, aged 150. Dumitur Raduly, of Haromſzeck,

Tranſylvania, died Jan. 12, 1782, aged 140. Titus Fullonius, of Bononia, aged 150. Abraham Paiba, of Charleſtown, South Carolina, aged 142. L. Tertulia, of Arminium, aged 137. Lewis Cornaro, of Venice, aged 100. Robert Blakeney, Eſq. of Armagh, Ireland, aged 114. Margaret Scott, of Dalkeith, Scotland, aged 125. W. Gulſtone, of Ireland, aged 140. J. Bright, of Ludlow, aged 105. William Poſtell, of France, aged 120. Jane Reeves, of Eſſex, aged 103. W. Paulet, Marquis of Wincheſter, of Hampſhire, aged 106. John Wilſon, of Suffolk, aged 116. Patrick Wian, of Leſbury, Northumberland, aged 115. M. Laurence of Arcades, aged 140. Evan Williams, of Caermarthen work-houſe, was alive in October 1782, aged 145. John Jacobs, of Mount Jura, aged 121. This man, in 1789, at the age of 120, quitted his native hills, and from the ſummit of Mount Jura undertook a journey to Verſailles, to behold and return thanks to the national aſſembly for the vote which had freed him and his poor countrymen from the feudal yoke. In the early part of his life, he was a ſervant in the family of the Prince de Beaufremont. His memory continued good to the laſt day of his life; and the principal inconveniences which he felt from his great age were, that his ſight was weakened, and the natural heat of his body was ſo diminiſhed, that he ſhivered with cold in the middle of the dog-days if he was not ſitting by a good fire. This old man was received in the body of the houſe by the national aſſembly, indulged with a chair, and directed to keep on his hat leſt he ſhould catch cold if he were to ſit uncovered. A collection was made for him by the members, which exceeded 500l. ſterling; but he lived not to return to Mount Jura. He was buried on Saturday the 31ſt of January 1790, with great funeral pomp, in the pariſh-church of St. Euſtace, at Paris. Mathew Tait, of Auchinleck, Airſhire, died Feb. 19, 1792, aged 123: he ſerved as a private at the taking of Gibraltar in 1704. Donald Macleod, of the Iſle of Sky, was living in May 1793, aged 105. There was living in Portſmouth poor-houſe, in May 1793, one Elizabeth Bennett, aged 104 years.

Before we proceed to aſſign the common cauſes of longevity, it is proper to inquire into the manner of life and the ſituation of thoſe by whom it has been enjoyed. We find, then, that thoſe who have lived to the greateſt age have been ſuch as did not attain their full growth till a very advanced period of life, and who have kept their appetites and paſſions under the moſt complete ſubjection. In a word, thoſe who have exceeded 100 years, have in general been robuſt, laborious, ſober, and careful to obſerve the ſtricteſt regimen. Enjoying a good conſtitution from nature, they have ſeldom or never been ſubject to diſeaſe. They have even enjoyed the greateſt health and vigour, and retained the uſe of their ſenſes, to the laſt moment of their lives.

Among

Among thoſe who have led a life of contemplation and ſtudy, many have reached a very advanced age. Longevity is frequent among the different orders of religious, who by their ſtatutes are confined to a moderate diet, and obliged to abſtain from wine and the uſe of meat. Some celebrated anchorets have lived to a great age while they fed upon nothing but the wild roots and fruits which they found in the deſert whither they had retired. The philoſopher Xenophilus, who lived to the age of 106, was of the Pythagorean ſect. It is well known, that thoſe philoſophers who held the tranſmigration of ſouls denied themſelves the uſe of meat, becauſe they imagined that killing an animal would be to aſſaſſinate another ſelf. A country life has produced many ſound and vigorous old men. It is ſuppoſed that a happy old age is attained with greater difficulty in towns than in the country. Sir Hans Sloane, Duverney, and Fontenelle, however, are inſtances of men whoſe lives have been ſpent in cities, and yet extended to a very great length. It has been obſerved, that men deprived of reaſon live very long; which is to be imputed to their being exempt from thoſe inquietudes which are the moſt deadly poiſon. Perſons poſſeſſing a ſufficiently good underſtanding, but deſtitute of ambition, have been found to enjoy very long life. Men who are devoid of pretenſions, who are free from thoſe cares which a deſire of ſhining by a diſplay of talents, or of acquiring dignity and power, neceſſarily brings in its train, who feel no regret for the paſt nor anxiety about the future, are ſtrangers to thoſe torments of the mind which waſte and conſume the body. To that tranquillity of ſoul, which is ſo excellent a prerogative of infancy, they add that of being long young by phyſical conſtitution, on which the moral has a ſtriking and powerful influence.

Premature wiſdom, and early talents, are often fitter to excite aſtoniſhment than expectation. The rapid unfolding of the moral faculties, by ſhortening the period of youth, ſeems to diminiſh in proportion the total duration of life. We have known a young lady of ſeventeen, who could ſpeak very correctly ſeven languages: ſhe tranſlated and wrote Latin, Greek, Italian, Spaniſh, German, Engliſh, and French; but ſhe died at the age of eighteen. The young man by whom ſhe was aſked in marriage, having been informed that he could not obtain her hand till he had made himſelf worthy of her by the ſame degree of talents and information, died the ſame year, and at the ſame age.

From the preceding obſervations, Haller has attempted to deduce the cauſes why a few men are longer exempted than others from the common fate.—The circumſtances which oppoſe their influence are independent of our will; ſuch as the ravages of epidemic diſtempers; trouble and anxiety of mind, which create diſeaſes in the body: or the torments of ambition. It is neceſſary to live in a ſalubrious climate; to enjoy a fortune ſufficiently eaſy to exclude thoſe uneaſy deſires which

create a feeling of want and privation; to be deſcended from healthy parents, to avoid drinking wine in youth; to drink water; and to eat little meat, and a great deal of vegetables. It is neceſſary alſo to be temperate in meals; moderate in pleaſures, ſtudy, and exerciſe; to be naturally inclined to cheerfulneſs; and to allot a due time to ſleep and repoſe.—Long life is certainly very rare; but, as has been already obſerved, we muſt diſtinguiſh between what is natural to the conſtitution of man and that which is the conſequence of his condition. By the former he is made to be long-lived: but nature is arreſted in her courſe by local and accidental cauſes, which it is not always in our power to avoid.

Let us take a retroſpective view of man's life from his infancy, and enumerate the chief of theſe different cauſes. Of a thouſand infants, extracted from the London bills of mortality, twenty-three died almoſt as ſoon as they came into the world; teething carried off fifty, and convulſions two hundred and ſeventy-ſeven: eighty died of the ſmall-pox, and ſeven of the meaſles. Among the adult females, eight at leaſt died in child-bed: conſumption and aſthma, diſeaſes more frequent in England than in France, carried off a hundred and ninety-one of the ſame ſex, and almoſt a fifth part of the full-grown men. A hundred and fifty died of fevers. At a more advanced age, twelve died of apoplexy, and forty-one of dropſy, without mentioning thoſe to whom diſeaſes of little importance in themſelves became mortal. There only remained ſeventy-eight whoſe death could be aſcribed to old age; and of theſe twenty-ſeven lived to the age of eighty and upwards. Among the different diſeaſes of which we have juſt now ſeen the fatal effects, and which carry off more than nine-tenths of mankind, not one, it muſt be allowed, is natural to the conſtitution. The inhabitants of this iſland are in general but little ſubject to diſeaſes, excepting the ſmall-pox and the meaſles; and many of them enjoy uninterrupted health to old age.—And here it may be proper to mention what are the moſt prevalent diſeaſes in other countries, which prove equally fatal to the duration of human life. In northern climates, ſcurvy, the cholic of the Laplanders, and the diſeaſes of the lungs, moſt frequently occaſion death. In temperate climates, dropſy carries off a great many at the beginning of old age, which is the boundary of life in the greateſt part of both ſexes, when they have eſcaped the acute diſeaſes, ſuch as putrid fever, &c. Acute diſeaſes are moſt common in warm countries. In ſome places, the rays of the ſun kill in a few hours thoſe who are expoſed to its burning heat. The air of Egypt and of Aſia Minor engenders the plague, by which one half of their inhabitants are carried off. Between the tropics men are ſubject to dyſenteries and violent fevers. The cold of the night, in warm climates, occaſions ſometimes violent diſeaſes, ſuch as palſy, quinſey, and a ſwelling of the head. Damp and marſhy places give riſe to fevers

of

of a different kind, but alſo very dangerous. The life of ſailors has a great tendency to produce ſcurvy. How many profeſſions prove fatal to the health, and haſten that period which nature would have brought on by ſlow degrees! Miners, ſtone-cutters, gilders, perſons employed in emptying privies, &c. are ſubject to diſeaſes of the lungs, and become paralytic. Other profeſſions of life bring on other accidents, of which it would carry us too far to give a particular account. What has been ſaid is ſufficient to ſhow, that it is the dangers with which we are ſurrounded that ſhorten the period of human exiſtence.

By examining the liſt of thoſe who have attained a great age, it will be found that mankind are longer lived in northern than in ſouthern countries. It has been obſerved, that there are more old men in mountainous and elevated ſituations than in plains and low countries. We repeat it, if the duration of life among the inhabitants of ſouthern climates be compared with the duration of life in northern nations, it will be allowed, that the latter enjoy both longer life and better health than the former. Their growth being retarded by the rigour of the climate, their decay muſt alſo be ſlower, becauſe of the proportion which exiſts between the growth of animals and the length of their lives. Among ten perſons who have lived to the age of an hundred, eight or nine will be found to have lived in the north.

It appears from the bills of mortality, that in the country more boys are born than girls; in cities, on the contrary, the number of females is commonly greateſt. Obſervations made with great care prove, that in moſt countries there are fewer men alive than women, and that more males die, chiefly at the firſt and laſt periods of life. In Sweden, the whole number of females, in 1763, was to that of males in the proportion of ten to nine. The number of old women who exceeded eighty years of age was to that of old men of the ſame age in proportion of thirty-three to nineteen; and there were more women than men who had attained the age of eighty-ſix, in proportion of almoſt two to one.

Dr. Price made obſervations, after Dr. Percival, on the difference of longevity, and the duration of human life, in towns, country-pariſhes, and villages; of which the following is the reſult: a greater number in proportion die in great towns than in ſmall ones, and a greater number in the latter than in villages. The cauſe of this difference, which is found to be very great, muſt be, in the firſt place, the luxury and diſſipation which prevail in towns; and, ſecondly, the badneſs of the air. In the town of Mancheſter, according to obſervation, 1-28th of the inhabitants die annually; whereas in the neighbouring country, the number of deaths does not exceed 1-46th of the whole inhabitants. It may be laid down as a general principle, that in great towns, the number of deaths annually is from

one in nineteen to one in twenty-two or twenty-three; in middling towns, from one in twenty-four to one in twenty-eight; and in country parifhes and villages feldom more than one in forty or fifty. In 1763, the number of inhabitants in Stockholm amounted to 72979. The average number of deaths for the fix years preceding had been 3802, which makes one in nineteen annually; while throughout all Sweden, including the towns and the country, not more than one in thirty-five die annually. At Rome the inhabitants are numbered every year. In 1771 they were found to amount to 159675: the average number of deaths for ten years was 7367; which makes one in twenty-three and a half annually. In London not lefs than one in twenty three-fourths of the inhabitants die every year.

M. Daubenton has given, in the Encyclopédie Méthodique, a table of the probabilities of the duration of life, conftructed from that which is to be found in the feventh volume of the Supplémens à l'Hiftoire Naturelle de M. de Buffon. The following is an abridgement of it:

Of twenty-three thoufand nine hundred and ninety-four children, born at the fame time, there will probably die,

In one year - - - -	7998
Remaining 2-3ds, or 15996.	
In eight years - - - -	11997
Remaining 1-half, or 11997.	
In thirty-eight years - - - -	15996
Remaining 1-3d, or 7998.	
In fifty years - - - -	17994
Remaining 1-4th, or 5998	
In fixty-one years - - - -	19995
Remaining 1-6th, or 3999.	
In feventy years - - - -	21595
Remaining 1-10th, or 2399.	
In eighty years - - - -	22395
Remaining 1-40th, or 599.	
In ninety years - - - -	23914
Remaining 1-300th, or 79.	
In one hundred years - - -	23992
Remaining 1-10000th, or 2.	

It thus appears, that a very fmall number of men indeed pafs through all the periods of life, and arrive at the goal marked out by nature. Innumerable caufes accelerate our diffolution. The life of man, we have obferved, confifts in the activity and

and exercise of his organs, which grow up and acquire strength during infancy, adolescence, and youth. No sooner has the body attained its utmost perfection, than it begins to decline. Its decay is at first imperceptible; but in the progress of time the membranes become cartilaginous, the cartilages acquire the consistence of bone; the bones become more solid, and all the fibres are hardened. Almost all the fat wastes away; the skin becomes withered and scaly; wrinkles are gradually formed; the hair grows white; the teeth fall out; the face loses its shape; the body is bent; and the colour and consistence of the crystalline humour become more perceptible. The first traces of this decay begin to be perceived at the age of forty, and sometimes sooner; this is the *age of decline*. They increase by slow degrees till sixty, which is the *period of old age*. They increase more rapidly till the age of seventy or seventy-five. At this period *craziness* begins, and continues always to increase. Next succeeds *decrepitude*, when the memory is gone, the use of the senses lost, the strength totally annihilated, the organs worn out, and the functions of the body almost destroyed. Little now remains to be lost; and, before the age of ninety or a hundred, death terminates at once decrepitude and life.

The body then dies by little and little; its motion gradually diminishes; life is extinguished by successive gradations, and death is only the last term in the succession. When the motion of the heart, which continues longest, ceases, man has then breathed his last; he has passed from the state of life to the state of death; and, as at his birth a breath opened to him the career of life, so with a breath he finishes his course.

This natural cause of death is common to all animals, and even to vegetables. We may observe that the centre of an oak first perishes and falls into the dust, because these parts, having become harder and more compact, can receive no further nourishment. The causes of our dissolution, therefore, are as necessary as death is inevitable; and it is no more in our power to retard this fatal term than to alter the established laws of the universe. Hence the following maxim has been universally adopted; *Contra vim mortis, nullum medicamentum in hortis.* In whatever manner death happens, the time and circumstances thereof are unknown. It is considered, however, as at all times terrible, and the very thoughts of it fill the mind with fear and trouble. It is notwithstanding our duty frequently to direct our thoughts to that event, which must inevitably happen, and by a life of virtue and innocence to prepare against those consequences which we so much dread.

As in women the bones, the cartilages, the muscles, and every other part of the body, are softer and less solid than those of men, they must require more time in hardening to that degree which occasions death.—Women of course ought to live longer than men. This reasoning is confirmed by experience; for, by consulting

the bills of mortality, it appears, that, after women have paſſed a certain age, they live much longer than men who have arrived at the ſame age.—In like manner, it is found by experience, that in women the age of youth is ſhorter and happier than in men, but that the period of old age is longer, and attended with more trouble. *Citius pubeſcunt, citius ſeneſcunt.*

After death, the organization of the body begins to be diſſolved, and all the parts relax, corrupt, and ſeparate. This is produced by an inteſtine fermentation, which occaſions putrefaction, and reduces the body to volatile alkali, fetid oil, and earth.

The deſire of ſelf-preſervation, and of protracting the ſhort ſpan of life, is ſo intimately interwoven with our conſtitution, that it is juſtly eſteemed one of the firſt principles of our nature, and, in ſpite even of pain and miſery, ſeldom quits us to the laſt moments of our exiſtence. It ſeems, therefore, to be no leſs our duty than our intereſt to examine minutely into the various means that have been conſidered as conducive to health and long life; and, if poſſible, to diſtinguiſh ſuch circumſtances as are eſſential to that great end, from thoſe which are merely accidental.

It has long been known that freſh air is more immediately neceſſary to life than food; for a man may live two or three days without the latter, but not many minutes without the former. The vivifying principle contained in the atmoſphere, ſo eſſential to the ſupport of flame, as well as animal life, concerning which authors have propoſed ſo many conjectures, is nothing elſe but the pure oxygenated fluid diſcovered by that ingenious philoſopher Lavoiſier. The common atmoſphere may well be ſuppoſed to be more or leſs healthy in proportion as it abounds with this animating principle. As this exhales in copious ſtreams from the green leaves of all kinds of vegetables, even from thoſe of the moſt poiſonous kind, may we not, in ſome meaſure, account why inſtances of longevity are ſo much more frequent in the country than in large cities; where the air, inſtead of partaking ſo largely of this ſalutary impregnation, is daily contaminated with noxious animal effluvia.

With reſpect to climate, various obſervations conſpire to prove, that thoſe regions which lie within the temperate zones are beſt calculated to promote long life. Hence, perhaps, may be explained, why Italy has produced ſo many long livers, and why iſlands in general are more ſalutary than continents; of which Bermudas and ſome others afford examples. And it is a pleaſing circumſtance that our own iſland appears to contain far more inſtances of longevity than could well be imagined. The ingenious Mr. Whitehurſt aſſures us, from certain facts, that Engliſhmen are in general longer lived than North Americans; and that a Britiſh conſtitution will laſt longer, even in that climate, than a native one. But it muſt be allowed

allowed in general, that the human conſtitution is adapted to the peculiar ſtate and temperature of each reſpective climate, ſo that no part of the habitable globe can be pronounced too hot or too cold for its inhabitants. Yet, in order to promote a friendly intercourſe between the moſt remote regions, the Author of nature has wiſely enabled the inhabitants to endure great and ſurpriſing changes of temperature with impunity.

Though foods and drink of the moſt ſimple kinds are allowed to be the beſt calculated for ſupporting the body in health, yet it can hardly be doubted but variety may be ſafely indulged occaſionally, provided men would reſtrain their appetites within the bounds of temperance; for bountiful Nature cannot be ſuppoſed to have poured forth ſuch a rich profuſion of proviſions, merely to tantalize the human ſpecies, without attributing to her the part of a cruel ſtep-dame, inſtead of that of a kind and indulgent parent. Beſides, we find, that, by the wonderful powers of the digeſtive organs, a variety of animal and vegetable ſubſtances, of very diſcordant principles, are happily aſſimilated into one bland homogeneous chyle; therefore it ſeems natural to diſtruſt thoſe cynical writers, who would rigidly confine mankind to one ſimple diſh, and their drink to the mere water of the brook. Nature, it is true, has pointed out that mild inſipid fluid as the univerſal diluent, and therefore moſt admirably adapted for our daily beverage: but experience has equally proved, that vinous and ſpirituous liquors, on certain occaſions, are no leſs ſalutary and beneficial, whether it be to ſupport ſtrength againſt ſickneſs or bodily fatigue, or to exhilarate the mind under the preſſure of heavy misfortunes. But, alas! what Nature meant for innocent and uſeful cordials, to be uſed only occaſionally, and according to the direction of reaſon, cuſtom and caprice have, by degrees, rendered habitual to the human frame, and liable to the moſt enormous and deſtructive abuſes. Hence it may be juſtly doubted, whether gluttony and intemperance have not depopulated the world more than even the ſword, peſtilence, and famine. True, therefore, is the old maxim, *Modus utendi ex veneno facit medicamentum, ex medicamento venenum.*

It is allowed on all hands, that alternate motion and reſt, and ſleep and watching, are neceſſary conditions to health and longevity; and that they ought to be adapted to age, temperament, conſtitution, temperature of the climate, &c. but the errors which mankind daily commit in theſe reſpects become a fruitful ſource of diſeaſes. While ſome are bloated and relaxed with eaſe and indolence, others are emaciated and become rigid through hard labour, watching, and fatigue.—Where the animal functions are duly performed, the ſecretions go on regularly; and the different evacuations ſo exactly correſpond to the quantity of aliment taken in, in a given time, that the body is found to return daily to nearly the ſame weight. If any

particular evacuation happen to be preternaturally diminiſhed, ſome other evacuation is proportionally augmented, and the equilibrium is commonly preſerved; but continued irregularities, in theſe important functions, cannot but terminate in diſeaſe.—The due regulation of the paſſions, perhaps, contributes more to health and longevity than that of any other of the non-naturals. The animating paſſions, ſuch as joy, hope, love, &c. when kept within proper bounds, gently excite the nervous influence, promote an equable circulation, and are highly conducive to health; while the depreſſing affections, ſuch as fear, grief and deſpair, produce the contrary effect, and lay the foundation of the moſt formidable diſeaſes.

From the light which hiſtory affords us, as well as from the foregoing liſt of long lives, there is great reaſon to believe, that longevity is in ſome meaſure hereditary; and that healthy long-lived parents would commonly tranſmit the ſame to their children, were it not for intemperance, and the frequent errors in medical advice, which ſo evidently tend to the abbreviation of human life.—Where is it, but from theſe cauſes, and the unnatural modes of living, that, of all the children which are born in the capital cities of Europe, nearly one half die in early infancy? To what elſe can we attribute this extraordinary mortality? Such an amazing proportion of premature deaths is a circumſtance unheard-of among ſavage nations, or among the young of other animals! In the earlieſt ages, we are informed, that human life was protracted to a very extraordinary length; yet how few perſons, in theſe latter times, arrive at that period which nature ſeems to have deſigned! Man is by nature a field-animal, and ſeems deſtined to riſe with the ſun, and to ſpend a large portion of his time in the open air, to inure his body to robuſt exerciſes and the inclemency of the ſeaſons, and to make a plain homely repaſt only when hunger dictates. But art has ſtudiouſly defeated the kind intentions of nature; and, by enſlaving him to all the blandiſhments of ſenſe, has left him, alas! an eaſy victim to folly and caprice. Let the conſideration of the following ſubjects direct every one, who values health and long life, to purſue the means nature has pointed out for their preſervation and ſuſtenance.

Of NUTRITION.

NUTRITION, in the animal œconomy, is the acceſſion of new parts to the body, either for its augmentation, or for the reparation of ſuch as are worn off, or exhaled through the pores and perſpiring veſſels, whereby the fluids are diminiſhed, and the body falls away. So that, to preſerve life, it is neceſſary that a reſtitution be made to the juices and ſolids of the body, at leaſt equal to what is loſt by thoſe motions; which is what we call the *action of nutrition*. Now the loſt juices are eaſily and quickly ſupplied by aliment, air, &c. but the nutrition

of the ſolid parts is much more obſcure. This, indeed, has proved a ſubject of infinite doubts and differences among authors; nor had we any rational or ſatisfactory account of the ſame, till that of the accurate Boerhaave, whoſe doctrine is as follows.

Every ſolid part of the body conſiſts of other ſmaller ones, in all reſpects like the larger; veſſels, of veſicles, and thoſe of others ſtill ſmaller; bones, of officles, &c. Which ſtructure goes beyond all limits of ſenſe, however aſſiſted by art; as appears by the experiments and obſervations of Malpighi, Ruyſch, Leeuwenhoek, and Hooke. Yet it is ſcarcely poſſible this diviſion and ſubdiviſion ſhould be infinite, as thoſe of foods and juices are. Again, it appears from microſcopes, injections, ſmall wounds, exſiccations, &c. that the ſolid parts of the body are very ſmall, compared with the fluids; and it is alſo demonſtrable, from conſidering the riſe and generation of the veſſels, and the reſolution of the greater veſſels into their ſmaller conſtituent ones, that all the ſolid maſs of the body is conſtructed of mere nerves, as its elements. And, in effect, all this maſs, an incredible ſmall particle only excepted, at firſt aroſe out of what was a very ſmall colliquament, much like the nervous juice itſelf; as is abundantly ſhown by the great Malphighi, in his two treatiſes on incubated eggs. For neither does the white of the egg nouriſh, till, by means of the incubation, it has paſſed innumerable degrees of fluidity, from its firſt thickneſs, to that exceeding ſubtilty wherein it terminates. But, even then, the liquor, thus given to the embryo, is exceedingly thick, in compariſon with what it is to be when converted into its veſſels and viſcera. Now, the firſt tender ſolids, ariſing from this ſubtle humour, do again paſs infinite intermediate degrees, before they arrive at their utmoſt ſtate and conſiſtence; as is ſhown by Malpighi in eggs, and by Ruyſch in embryoes and fœtuſes. Hence, therefore, it follows, that the ſolids, in their firſt formation out of the liquids whence they ariſe, only differ from them in reſt, coheſion, and figure. Therefore ſuch a particle, now in its fluid ſtate, will become a part of the ſolid to be formed out of it, as ſoon as there happens to be a power to effect its coheſion with the other ſolid parts, howſoever that coheſion be effected.

This coheſion is eaſily produced in a fibre already formed, if there happen to be a proper cavity in the ſolid, left open by ſome loſt particle; and, at the ſame time, a particle in the fluid, anſwerable thereto in bulk, figure, and nature; and, laſtly, if there be a power wherewithal to intrude it into that place, or accomodate it thereto. Thus will ariſe a real nutrition of the ſolids in the minute veſſels, by whoſe union the large ones are formed; that is, in the nerves, or in veſſels ſimilar thereto. Which being impracticable by any other liquid than that brought into theſe veſſels, it appears very evident, that the nervous juice, at leaſt a juice perfectly like

like it, is the immediate matter of nutrition: whence nutrition appears one of the laſt and moſt perfect actions of the body; ſince, to have this laudable, all the precedent actions muſt of neceſſity have been ſo. The chyle, therefore, which ſome make the immediate matter of nutrition, is, indeed, fitted to fill the larger veſſels; but it cannot nouriſh or reſtore them. This, when attenuated, changed, more intimately mixed in the lungs by means of reſpiration, and thus fitted for the paſſage of certain veſſels, is indeed rendered fitter, yet far from being quite fit, to be the matter of nutrition. But, by the repeated action of the lungs, the viſcera, veſſels, &c. there is formed, out of this humour, a ſoft, tenacious, plaſtic, inſipid, ſerum, which, thickening by the fire, becomes perfectly like the white of an egg. This fluid, therefore, has in it all the conditions found in that, from whence, by ſure experience, we know all the ſolid parts of an animal ariſe by mere incubation. It is, therefore, a ſtep nearer; but is not yet quite diſpoſed for nutriment; much leſs is the cruor, or red globular part of the blood, ſo. Neither are yet fitted to enter the veſſels; yet both the one and the other are, by different authors, made the nutritive juice. But, as the heat of the incubation, ſo the action of the viſcera and veſſels on the ſerum, introduces various changes therein, till at length a part of it be rendered ſubtile enough for the purpoſe required. This, when exhauſted, is inſtantly repaired: and thus we have the true immediate matter of nutrition.

The matter of nutrition thus aſcertained, the manner wherein, and the cauſe whereby, it is effected, are as follows: A juice being driven directly through a full, conic or cylindric, elaſtic or rigid, canal; if its courſe be from a wider to a narrower part, or if it have any thing to oppoſe its motion, will endeavour to ſtretch the ſides of its canal, according to the axis of its length. This muſt be the caſe every-where in the body, except, perhaps, in the veins and receptacles. By this *niſus*, or endeavour, how weak ſoever, continually repeated, the veſſels will be inſenſibly lengthened out; and, in lengthening, they will be made more and more ſlender. Hence the laſt extremities of the veſſels, which in man are extremely ſmall, are continually ſtretched, and rendered leſs and leſs coherent, i. e. ſtill nearer and nearer to a diſſolution; and thus at length will they cohere ſo weakly, as ſcarcely to differ from fluids. While ſuch motion goes on, therefore, and the propulſion is continued, there will, of neceſſity, happen theſe two things: Firſt, the outmoſt particles of the minuteſt tubes being torn off, will again be converted into a kind of humour, what part of the body ſoever they ſtick in. Secondly, the ſmalleſt particles, which, by their union, compoſed the ſlendereſt fibrillæ, will be ſo ſeparated from each other, as to leave open interſtices in thoſe places, where, before, they cohered. Both theſe effects will be produced at all times, and in all parts of the body, ſo long as life continues, eſpecially where nature is ſtrong, and

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the actions of the body violent. But the ſame humour whereby theſe effects are produced, containing abundance of particles ſimilar to thoſe thus ſeparated and loſt, conveys and applies them to thoſe interſtices, by that very impetus whereby it endeavours to diſtend the canals; and, thus intercepted, at length it forms, adapts, and faſtens, them, ſo as to adhere in the ſame manner as the former. The matter, preparation, application, energy of motion, ſtill remaining the ſame; what, from time to time, is loſt, is thus preſently reſtored; and the ſolids continue in the ſame ſtate as before, that is, they are perpetually nouriſhed, and ſupplied, and preſerved.

In this the Creator's wiſdom is very conſpicuous; in that the ſame power which inevitably deſtroys does repair again at the ſame time, and by the ſame action; and that, the greater the loſs is, the more copious the ſupply; and, laſtly, that thoſe parts firſt ſpent in the action of the body are the firſt reſtored. Farther, it is evident, that the newer, the more tender, and the nearer to the moving cauſe, theſe veſſels are, the more eaſily will they be lengthened, diſtended, deſtroyed, and repaired: our bodies, therefore, the nearer to the origin, the more do they grow. For, the action ſtill continuing, the greater veſſels become more extended by their fluid; and at the ſame time the ſmaller, whereof the membranes or coats, of the larger ſort are compoſed, are compreſſed, dried, and at laſt concreted, and grow up; whence ariſes a firmneſs, indeed, of the fibres, but a loſs of the veſicles. Thus what were formerly veſſels commence mere hard ligaments; and thus, the fluids being once fixed, the ſeveral veſſels coaleſce; from the concurrence of theſe cauſes ariſe the ſtrength, hardneſs, rigidity, and thickneſs, of the ſolid parts. Hence the number of veſſels is greateſt in embryoes, and, as age comes on, it ſenſibly diminiſhes; and hence it is, that their weakneſs conſtantly declines, and their ſtrength and firmneſs increaſe. In young people, therefore, the quantity of humours is redundant, and greatly exceeds the ſolids: in old men, the ſolids exceed the fluids. And hence we ſee the reaſon, manner, and appearance, of growth, ſtate, declenſion, and, at length, of death from pure old age.

A perſon who conſiders this account, and compares it with what is actually obſervable in the body, will find every circumſtance to obtain: thus the whole cuticula is every-where, and at all times, conſtantly deſquamating, peeling off, and again renewing; and thus the hair, nails, teeth, continually rubbed, torn, and worn off, come again: parts taken off from the veſſels and the bones ſoon grow again: and the ſordes, or filth, rubbed off from the extremities of the veſſels, when examined by a microſcope, or diluted, and viewed in water, appear plainly to conſiſt both of ſolid and fluid parts; and thoſe carried off by waſhing, ſhaving, &c. are the ſame. Hence too, we ſee, that a general increaſe of the bulk of the body, with regard to habit, as in fat, fleſhy, brawny, perſons, does not ariſe from any

increaſe of the ſolids, but by their extenſion into larger cavities, crowded with ſtagnant humours. And hence fatneſs becomes hurtful, as it loads, weakens, and ſuffocates. Whence ariſes a very conſiderable diſtinction between nutrition and repletion, to which a phyſician ſhould have ſpecial regard; the one ſtrengthening and condenſing the veſſels; the other weakening, looſening, and extending, the ſame. Hence, laſtly, we ſee why the fabric of the ſolids is not deſtroyed by the contained fluids; how our machine comes to ſubſiſt ſo long; why, when a nerve is corrupted, the nutrition of that part it belongs to ceaſes; and why the ſame obtains in an artery; why in an embryo there are no ſolids, in a fœtus very few, in old men a great deal; and why even the nerves, tendons, arteries, and receptacles, become firſt cartilaginous, and then bony. Dr. Prieſtley concludes, from ſome experiments undertaken with a view of diſcovering the principle of nutrition in vegetable and animal ſubſtances, that this principle is phlogiſton, in ſuch a ſtate as to be capable of becoming, by putrefaction, a true inflammable air, (hydrogenous gas;) but not generally ſuch as to burn with exploſion, but rather with a blue and lambent flame, mixed with a certain proportion of fixed air. This principle in nutrition is immediately held in ſolution by the gaſtric juice, and in the chyle formed by it; and, when it has entered into the circulation with the chyle, and anſwered the purpoſe in the animal œconomy for which it is deſigned, it is thrown out again by means of the blood in the lungs, and communicated to the air, which is phlogiſticated with it.

Of FOOD, or ALIMENT.

FROM aliment, or food, by the proceſs of digeſtion, is prepared a very mild, ſweet, and whitiſh, liquor, reſembling milk, and diſtinguiſhed by the name of *chyle;* which, being abſorbed by the lacteal veins, by them conveyed into the circulation, and there aſſimilated into the nature of blood, affords that ſupply of nutrition, which, as we have ſeen above, the continual waſte of the body is found to require. Food is the moſt neceſſary thing for the preſervation of our bodies: and, as on the choice thereof our health greatly depends, it is of much importance to underſtand, in general, what is the propereſt for our nouriſhment; and, in particular deviations from health, what is the beſt adapted to reſtore us. Our blood and juices naturally incline to become putrid and acrimonious: freſh chyle, duly received, prevents this deſtructive tendency, and preſerves in them that mild ſtate which alone conſiſts with health. An animal diet affords the moſt of this bland nutritious mucilage; watery fluids dilute the too groſs parts, and carry off what is become unfit for uſe. It is only the ſmall portion of jelly which is ſeparated from the farinaceous parts of vegetables, that, after being much elaborated, is converted

verted into the animal nature; yet the uſe of vegetables prevents both repletion and a too great tendency to a putreſcent acrimony of the blood. In hot climates, as well as againſt the conſtitutional heat of particular perſons, vegetables are demanded in the largeſt portion; animal ſubſtances afford the higheſt reliſh while our appetite continues; but will ſate the appetite before the ſtomach is duly filled. Vegetables may be eaten after either fleſh or fiſh: few herbs or fruits ſatiate ſo much as that the ſtomach may not be filled with them when it is already ſatisfied with fleſh or fiſh; whence it may be obſerved, that no diet which is very nouriſhing can be eaten to fulneſs, becauſe its nutritious parts are oily and ſatiating. Health depends almoſt wholly on a proper craſis of the blood; and to preſerve this, a mixture of vegetables in ſome degree is always required, for a loathing is ſoon the conſequence of animal food alone: hot acrid habits, too, receive from milk and vegetables the needful for correcting their exceſſes; but in cold, pituitous, and nervous, habits, which want moſt nouriſhment from leaſt digeſtion, and from the ſmalleſt quantity of food, animal diet is to be uſed more freely.

As the blood, the nutritive juice, and in general all the parts of the body, are made up of three elements, viz. of one which is ſulphureous, oily, and inflammable; of one of an earthy, ſubtile, alkaline, nature; and of one of an aqueous nature: ſo the ſeveral kinds and virtues of food may be moſt commodiouſly reduced to theſe three claſſes; and aliments of theſe three ſeveral qualities, duly mixed with one another, afford a proper nouriſhment for the human body.—The fleſh of animals, eſpecially when roaſted, affords the body its principal ſupply of the ſulphureous part; but it is to be obſerved, that wild animals are preferable in this reſpect to the tame and domeſtic kind, becauſe their oils and ſalts are exalted by habitual exerciſe. Among the aliments which furniſh the blood with its humid parts, of animals, fiſh; and of vegetables, pot-herbs, the milder roots, and ſome ſummer-fruits; are reckoned the principal. To the third claſs, which ſupplies the blood with its fixed and earthy parts, belong all kinds of grain, as the ſeveral ſorts of bread, rice, peaſe, beans, lentils, cheſnuts, almonds, cocoa, cheeſe, &c. From what has been ſaid, it will appear that all ſuch aliments as are of a mild quality, and reſemble the chyle and blood, are fit for nouriſhment; that all ſuch food as either recedes from, or is quite oppoſite to, the nature of the chyle and blood, is unfit for nouriſhing the parts; that all food in which there is too much of an acid, is improper for nouriſhment, becauſe milk and blood will not mix with an acid, which is quite oppoſite to their natures, and induces a coagulation of the circulating juices; that all ſalts, and all foods too highly ſalted, muſt be unfit for nouriſhment, becauſe no ſalt whatever can be mixed with the blood, chyle, and milk;

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and laſtly, that the free uſe of ſpirits muſt be very detrimental both to health and nouriſhment, becauſe blood and chyle never incorporate with ſpirituous liquors, but rather ſeparate from them.

Thus much being obvious as general principles with reſpect to the matter and quality of our aliment, the valetudinarian may eaſily regulate his diet with ſome advantage to himſelf by an attention to the few enſuing particulars. In winter, eat freely, but drink ſparingly: roaſt meat is to be preferred, and what is drunk ſhould be ſtronger than at other ſeaſons. In ſummer, let thirſt determine the quantity to be drunk; cold ſtomachs never require much: boiled meats and vegetables, if not otherwiſe contradicted, may now be more freely uſed. Lax habits require the winter's diet to be continued all the year, and rigid ones ſhould be confined to that of ſummer. Occaſional faſting will prevent the neceſſity of periodical bleeding, &c. Thoſe who are troubled with eructations occaſioned by their food ſhould drink but little, and uſe ſome unaccuſtomed exerciſe. The thirſty ſhould drink freely, but eat ſparingly. In general, let moderation be obſerved; and, though no dinner hath been had, a light ſupper is at all times to be preferred. After very high ſeaſoned meats, a glaſs of water acidulated with the acid elixir of vitriol, or in very weak ſtomachs the ſweet elixir of vitriol, is far more aſſiſtant to the work of digeſtion than the common method of taking brandy.

As to common drink, water alone is ſufficient and effectual for all the purpoſes of nature. Strong liquors were never deſigned for common uſe. They were formerly kept here in England, as other medicines are, in apothecaries' ſhops, and preſcribed by phyſicians, as they do diaſcordium, and Venice treacle, to refreſh the weary, ſtrengthen the weak, and raiſe the low-ſpirited. The effect of the ordinary uſe of wine and ſpirituous liquors, as natural cauſes will always produce their effects, is to inflame the body into gout, ſtone, and rheumatiſm, fevers, pleuriſies, ſmall-pox, &c. to dry up the juices, and ſcorch and ſhrivel the ſolids. Thoſe whoſe appetite and digeſtion are good and entire, never want ſtrong liquors to ſupply them with ſpirits; ſuch ſpirits are too volatile and fugitive for any ſolid or uſeful purpoſes of life. Two ounces of fleſh-meat, well digeſted, beget a greater ſtock of more durable and uſeful ſpirits than ten times as much ſtrong liquor.

All ſtrong liquors are as hard to digeſt, and require as much labour of the concoctive powers, as ſtrong food itſelf. Water is the only univerſal diſſolvent, or menſtruum, and the moſt certain diluter of all bodies proper for food. There are a great many ſpirituous liquors, which not only will not diſſolve, but which will harden, and make more indigeſtible, certain parts, eſpecially the ſalts of bodies, wherein their active qualities, that is, thoſe which can do moſt harm to human conſtitutions,

ſtitutions, conſiſt. And we have known perſons of tender conſtitutions, who could neither eat nor digeſt upon drinking wine, but who, by drinking at meals common water, warmed, have recovered their appetites and digeſtion, and have thriven and grown plump. It is true, ſtrong liquors, by their heat, and ſtimulation on the organs of concoction, by increaſing the velocity of the motion of the fluids, and thereby quickening the other animal functions, will carry off the load that lies upon the ſtomach, with more *preſent* cheerfulneſs. But then, beſides the *future* damage of ſuch a quantity of wine to the ſtomach and fluids, by its heat and inflammation, the food is hurried into the habit unconcocted, and lays a foundation for a fever, a fit of the cholic, or ſome chronical diſeaſe. With reſpect to fermented liquors, which are commonly uſed, it may be obſerved, that thoſe which are too ſtrong hurt digeſtion, and are ſo far from ſtrengthening the body, that they weaken and relax it. They keep up a conſtant fever, which exhauſts the ſpirits, heats and inflames the blood, diſpoſes to numberleſs diſeaſes, and occaſions a premature old age. But fermented liquors may be too weak, as well as too ſtrong: theſe muſt either be drunk new, before the fermentation is over, and in this caſe will generate air in the bowels, and occaſion flatulencies; or they ſoon become ſtale, ſour the ſtomach, and injure digeſtion. On this account all malt liquors, cider, &c. ſhould be ſufficiently ſtrong to keep till they are ripe, and then they ſhould be uſed; and neither ſooner nor later. Liquors that are adulterated with a mixture of ingredients of the opiate kind, which are poiſonous in their quality, as they moſtly are by thoſe who make them for ſale, hurt the nerves, relax and weaken the ſtomach, and ſpoil its digeſtive powers.

A due regulation of the quantity and quality of our meat and drink, and a nice adjuſtment thereof to the concoctive powers, is of the utmoſt conſequence to health and long life. What we expend in motion, excretion, effluvia, &c. is but a determinate quantity; and the ſupply ſhould only keep pace with the expence; a juſt proportion of the two would, probably, preſerve us from acute diſtempers, as it certainly would from chronical ones; moſt or all of which proceed from repletion, as appears from their being cured by evacuation.

Phyſicians have attempted to determine the healthful quantity of food for a human body. Some ſay, that in winter, when the perſpiration of an unexerciſed perſon is only equal to the urine, the diet for twenty-four hours ought not to exceed four pounds, or four pounds and a half. In ſummer, the diet may be ſix pounds and a half, which may be carried off without the help of exerciſe, when the air is hot and dry. If the quantity of food be ſuch as to make the perſpiration and urine of a natural day always nearly equal, and the morning weight of the body always nearly the ſame, that quantity is the truly healthful quantity of food for grown

bodies which uſe but little exerciſe. The quantity of food neceſſary to keep a grown body in health, will be better and more eaſily digeſted, when it is ſo divided as to make the meals equal, than when they are very unequal. The diſtance between one meal and another ſhould bear ſome proportion to the largeneſs of the preceding meal. Good and conſtant health conſiſts in a juſt quantity of food, and a juſt proportion of the meat to the drink; and, in order to be freed from chronical diſorders contracted by intemperance, the quantity of food ought to be leſſened, and the proportion of the meat to the drink increaſed, more or leſs, according to the greatneſs of the diſorders; and both the quantity of food, and the proportion of meat to the drink, ought to be ſuch as ſhall make perſpiration and urine nearly equal at all ſeaſons of the year.

The quantity of animal food conſumed by the Engliſh is generally pernicious, becauſe it produces but little of that air which is antiſeptic: hence they are ſubject to the ſcurvy, and its numerous train of conſequences, indigeſtion, low ſpirits, hypochondriaciſm, &c. whereas, if vegetables and milk, whoſe antiſeptic quality, ariſing from the gas or air which they plentifully afford, were more uſed as food, we ſhould have leſs ſcurvy, and likewiſe fewer putrid and inflammatory fevers. One great reaſon why leproſies, hot ſcurvies, dyſenteries, plagues, peſtilential fevers, and the like diſtempers, formerly ſo frequent in London, are now ſo rare, is the change that has been made in the food of the inhabitants. Hopped beer, and wine, coming into general uſe, have been a great means of ſuppreſſing putrid diſeaſes; greens and fruit are likewiſe more univerſally eaten, and ſalted meats make a much leſs part of our food than formerly: to which may be added the more general conſumption of tea and ſugar.

Vegetable food is moſt proper for ſcorbutic and hectical perſons, and does very well with people who have much exerciſe; but in other circumſtances, a mixed diet of vegetable and animal ſubſtances, ſuch as is commonly uſed, ſeems beſt calculated to nouriſh and preſerve the body from decay.

The ſofter and milder kinds of aliment are proper for children, and for youth the ſtronger. Old people ought to leſſen the quantity of their food, and increaſe that of their drink: but yet ſome allowance is to be made for cuſtom, eſpecially in cold climates; for, as in theſe the appetite is keener, ſo is the digeſtion ſtronger and better performed.

Different ſexes alſo require a different food and regimen. Women are weaker than men, and for that reaſon require a food and regimen peculiar to themſelves; they are of a ſpungy and lax habit, and for the moſt part addicted to indolence and pleaſure, drink little, have bodies of a highly delicate and ſenſible nature, much inclined to ſpaſms and convulſive motions, and diſpoſed to generate a redundance of

of blood. Beſides, at certain ſtated times they have a regular evacuation by the veins of the uterus; and in conſequences of theſe circumſtances it is neceſſary that women, rather than men, ſhould obſerve a regimen and method of living peculiarly and accurately adapted to their habit and conſtitution.

Hence it is obvious, that the phyſician acts a prepoſterous and unaccountable part who to every one preſcribes the ſame method of living; or thinks, that what contributes to the health of one will without diſtinction or reſerve prove ſalutary to all. For we are ſufficiently taught by daily experience, that all ſubſtances are not equally adapted to all patients; and that what one may bear without being ſenſible of any bad effects, may to another prove prejudicial, and even fatal. Time itſelf has a conſiderable influence in determining the ſalutary or noxious effects of aliments; ſince ſome ſubſtances may ſafely, and without any bad conſequence, be uſed at one ſeaſon, which at another may contribute not a little to the deſtruction of health.

As to the effects of food on the mind, it is plain, that delicacy of feeling, livelineſs of imagination, quickneſs of apprehenſion, and acuteneſs of judgment, very frequently accompany a weak ſtate of the body. True it is, indeed, that the ſame ſtate is liable to timidity, fluctuation, and doubt; while the ſtrong have that ſteadineſs of judgment, and firmneſs of purpoſe, which are proper for the higher and more active ſcenes of life. The moſt valuable ſtate of the mind, however, appears to reſide in ſomewhat leſs firmneſs and vigour of body. Vegetable aliment, as never over-diſtending the veſſels or loading the ſyſtem, never interrupts the ſtronger motions of the mind; while the heat, fulneſs, and weight, of animal food, are an enemy to its vigorous efforts. Temperance, then, does not ſo much conſiſt in the quantity, for that always will be regulated by our appetite, as in the quality, viz. a large proportion of vegetable aliment.

Of AIR.

IT is no eaſy taſk to aſcertain the nature and origin of air, as being a fluid imperceptible to all our ſenſes, except that of feeling. Indeed, from the reſiſtance and impreſſion it makes, we know that there is ſuch a body, which every-where ſurrounds our earth, and is of the utmoſt importance, not only to mankind, in promoting many uſeful arts, but abſolutely neceſſary for the preſervation of health and life.

The wholeſomeneſs or unwholeſomeneſs of air is certainly owing to the different effluvia with which it abounds, and ought to be particularly attended to by the valetudinarian. The beſt air is to be met with in open champaign countries; where the ſoil is dry, not parched or ſandy, and ſpontaneouſly produces wild

thyme, wild marjoram, and the like ſweet-ſcented plants. That near rivers is rather prejudicial, unleſs they are ſmall, clear, and have a gravelly channel. The morning air is deemed more refreſhing than that of the evening, and air agitated with breezes than that which is ſerene and ſtill. As good air contributes greatly to health, ſo that which is bad is no leſs prejudicial to it. Stagnating air is productive of putrid and malignant diſorders, as dyſenteries, bilious fevers, &c. and that which is too moiſt, of inflammatory ones, as coughs, rheumatiſms, &c. Moiſt and rainy ſeaſons, however, differ widely in this reſpect; ſince, in marſhy countries, intenſe and continued heats occaſion the greateſt moiſture in the air: whereas frequent ſhowers, during the hot ſeaſon, cool it, check the exceſs of vapour, dilute and refreſh the corrupted ſtagnating water, and precipitate all noxious and putrid effluvia.

To the preſſure of air we are to attribute the coherence of the parts of bodies. Breathing too, on which depends animal life, is owing to the preſſure and ſpring of the air; and to the ſame cauſe may be attributed the production of fire and flame, as appears from the ſudden extinction of a coal or candle in the exhauſted receiver. It is likewiſe neceſſary for the exiſtence and preparation of ſounds, for the germination and growth of plants, for conveying all the variety of ſmells, and for tranſmitting the rays and influence of the celeſtial bodies. In ſhort, ſuch is the generating and vivifying power of air, that ſome of the ancient philoſophers conſidered it as the firſt principle of all things. Air not only acts upon all bodies by its common properties of weight and elaſticity, but by the peculiar virtues of the ingredients whereof it is compoſed. By means of a corroding acid, it diſſolves iron and copper, unleſs well defended by oil. Even gold, in the chemiſt's laboratory, when the air is impregnated with the effluvia of aqua regia, contracts a ruſt like other bodies. It fixes volatile bodies, and volatilizes thoſe which are fixed. From the different effluvia, diffuſed through the air, proceed a variety of effects. Near mines of copper, it will diſcolour ſilver and braſs; and in London, the air of which abounds with acid and corroſive particles, metalline utenſils ruſt ſooner than in the country. It is very difficult to obtain oil of ſulphur in a clear dry air, as its parts are then more ready to evaporate; whereas in a moiſt cloudy air it may be obtained in abundance. All ſalts melt moſt readily in cloudy weather; and ſeparations ſucceed beſt in the ſame ſtate of the air. If pure wine be carried into a place where the air is full of the fumes of wine then fermenting, it will begin to ferment afreſh.

Wherever air ſtagnates long, it becomes unwholeſome. Hence the unhappy perſons confined in gaols not only contract malignant fevers themſelves, but often communicate them to others. Nor are many of the holes, for we cannot call them houſes,

houſes, poſſeſſed by the poor in great towns, much better than gaols. Theſe low dirty habitations are the very lurking-places of bad air and contagious diſeaſes. Such as live in them ſeldom enjoy good health; and their children commonly die young. In the choice of a houſe, thoſe who have it in their power ought always to pay the greateſt attention to open free air. The various methods which luxury has invented to make houſes cloſe and warm, contribute not a little to render them unwholeſome. No houſe can be wholeſome unleſs the air has a free paſſage through it. For which reaſon houſes ought daily to be ventilated, by opening oppoſite windows, and admitting a current of freſh air into every room. Beds, inſtead of being made up as ſoon as people riſe out of them, ought to be turned down, and expoſed to the freſh air from the open windows through the day. This would expel any noxious vapour, and could not fail to promote the health of the inhabitants. In hoſpitals, gaols, ſhips, &c. where that cannot be conveniently done, ventilators ſhould be uſed. The method of expelling foul, and introducing freſh, air, by means of ventilators, is a moſt ſalutary invention, and is indeed the moſt uſeful of all our modern medical improvements. It is capable of univerſal application, and is fraught with numerous advantages, both to thoſe in health and in ſickneſs. In all places where numbers of people are crowded together, ventilation becomes abſolutely neceſſary. Air which ſtagnates in mines, wells, cellars, &c. is extremely noxious. That kind of air is to be avoided as the moſt deadly poiſon. It often kills almoſt as quickly as lightning. For this reaſon, people ſhould be very cautious in opening cellars that have been long ſhut, or going down into deep wells, or pits, eſpecially if they have been kept cloſe covered. We have daily accounts of perſons who loſe their lives by going down into deep wells and other places where the air ſtagnates. All theſe accidents might be prevented by only letting down a lighted candle before them, and ſtopping when they perceive it go out: yet this precaution, ſimple as it is, is ſeldom uſed.

If freſh air be neceſſary for thoſe in health, it is ſtill more ſo for the ſick, who often loſe their lives for want of it. The notion that ſick people muſt be kept very hot, is ſo common, that one can hardly enter the chamber where a patient lies, without being ready to faint, by reaſon of the hot ſuffocating ſmell. How this muſt affect the ſick any one may judge. No medicine is ſo beneficial to the ſick as freſh air. It is the moſt reviving of all cordials, if it be adminiſtered with prudence. We are not, however, to throw open doors and windows at random upon the ſick. Freſh air is to be let into the chamber gradually, and, if poſſible, by opening the windows of ſome other apartment.

There are many kinds of air, produced by accidental or artificial cauſes, of which the following are the moſt material:

Dephlogiſticated air, the oxygenous gas, or vital air, of the new chemiſtry, is an elaſtic fluid naturally extricated in the proceſs of vegetation; but artificially procured from nitre, minium, magneſia, water, &c. This is eminently capable of ſupporting flame and animal life, and is one of the component parts of our atmoſphere.

Phlogiſticated air, or azotic gas, is produced in great quantities during putrefaction and fermentation; and is alſo obtained in the calcination of metals and other phlogiſtic proceſſes. It deſtroys animal life, and extinguiſhes flame; but is very friendly to vegetation, and is another of the component parts of our atmoſphere.

Fixed air, or carbonic acid gas, derives its name from the property of adhering to certain bodies, and fixing itſelf in them. It conſiſts of dephlogiſticated air united to charcoal; this is obtained by fermentation, and in all phlogiſtic proceſſes, and manifeſts the properties of an acid. It extinguiſhes flame, and deſtroys animal life.

Inflammable air, (hydrogenous gas,) conſiſts wholly of charcoal and water rarefied by heat; and is remarkable for being the lighteſt of all gravitating ſubſtances. It is produced naturally from all putrid waters, and may be artificially procured from certain metallic ſolutions, by paſſing the ſteam of water over red-hot iron, and by diſtilling wood, pit-coal, &c. with a ſtrong heat, or by oppoſing charcoal to the heat of a burning lens in vacuo. It extinguiſhes flame, unleſs it be mixed with a certain proportion of atmoſpherical, or dephlogiſticated, air; in which caſe, it explodes violently. It deſtroys animal life, but is friendly to vegetation.

Nitrous air, or nitrous gas, is procured artificially by diſſolving metallic or other ſubſtances in nitrous acid. Being mixed with dephlogiſticated air, both the fluids loſe their elaſticity, and a ſmall quantity of nitrous acid is produced. It inſtantly kills animals and extinguiſhes flame. By union with ſome metals it is converted into volatile alkali. In ſome caſes it may be made to ſupport flame, and even animal life. Its property of condenſing with dephlogiſticated air, renders it a teſt of the ſalubrity of the atmoſphere.

Marine acid air, the muriatic acid gas of the new chemiſtry, is the ſame as marine acid reduced into vapour, and deprived of moſt of its waters.

Dephlogiſticated marine acid air, or oxygenated muriatic acid gas, is ſuppoſed by ſome to be the marine acid deprived of its phlogiſton; by others, to be the ſame acid with an addition of pure air. It deſtroys many kinds of colours, and, with inflammable air, regenerates common marine acid.

Alkaline air, or ammoniacal gas, is the ſame with pure volatile alkali, and is formed by an union of phlogiſticated and inflammable air.

Hepatic air, or ſulphureous acid gas, is produced from the decompoſition of liver of ſulphur by acids; and in the common atmoſphere it is inflammable, but does not burn with exploſion.

Atmoſpherical

Atmoſpherical air, is compoſed of dephlogiſticated and phlogiſticated air, and thus ſupports and ſuſtains both animal life and vegetation.

The exterior part of our habitable world is the air or atmoſphere, a ſpringy body, that encompaſſes the ſolid earth on all ſides, and is near a thouſand times lighter than water; and the higher it is, the leſs it is compreſſed by the ſuperior incumbent air; and ſo conſequently, it being a ſpringy body, the thinner it is. And, as a pillar of air of any diameter is equal in weight to a pillar of quickſilver of the ſame diameter of between twenty-nine and thirty inches high, we may infer that the top of the atmoſphere is not very near the ſurface of the ſolid earth. Now, as quickſilver is near fourteen times heavier than water, the atmoſphere will ſuſtain a column of water about fourteen times higher than the column of quick-ſilver, that is, about thirty-four feet; and, if we conſider that air is a thouſand times lighter than water, then a pillar of air, equal in weight to a pillar of quickſilver of thirty inches high, will be thirty-four thouſand feet; whereby we come to know, that the air or atmoſphere is at leaſt 34,000 feet, that is, about ſix miles, high, but probably much more. And if we conſider that the air is a ſpringy body, and that that which is neareſt the earth is compreſſed by the weight of all the atmoſphere above it, we ſhall find that the air near the ſurface of the earth is much denſer and thicker than it is in the upper regions. On this theory it may be accounted for why great cities are not ſo healthful to reſide in as ſmall towns and country villages; and why London is much more prejudicial to health, owing to the many works containing noxious effluvia poſſeſſed of the component parts mentioned in the different kinds of air, and conſequently forms an air to breathe in that is not congenial to the life of Man.

Of EXERCISE.

EXERCISE may be ſaid to be either active or paſſive. The active is walking, hunting, dancing, playing at bowls, and the like; as alſo ſpeaking, and other labour of the body and mind. The paſſive is riding in a coach, on horſeback, or in any other manner. Exerciſe may be continued to a beginning of wearineſs, and ought to be uſed before dinner in a pure light air; for which reaſon, journeys, and going into the country, contribute greatly to preſerve and re-eſtabliſh health. Exerciſe increaſes the circulation of the blood, attenuates and divides the fluids, and promotes a regular perſpiration, as well as a due ſecretion of all the humours; for it accelerates the animal ſpirits, and facilitates their diſtribution into all the fibres of the body, ſtrengthens the parts, creates an appetite, and helps digeſtion. Whence it ariſes, that thoſe who accuſtom themſelves to exerciſe are generally very robuſt, and ſeldom ſubject to diſeaſes.

Boerhaave

Boerhaave recommends bodily exercife in difeafes of a weak and lax fibre. By riding on horfeback, the pendulous vifcera of the abdomen are fhaken every moment, and gently rubbed as it were one againft another, while in the mean time the pure air acts on the lungs with greater force. But it is to be obferved, that a weak man fhould not ride with a full ftomach, but either before dinner or after the digeftion is near finifhed; for, when the ftomach is diftended, weak people do not bear thefe concuffions of the horfe without difficulty; but, when the primæ viæ are near empty, the remaining fæces are difcharged by this concuffion. Sailing in a fhip is alfo an exercife of great ufe to weak people. If the veffel moves with an even motion, by increafing perfpiration it ufually excites a wonderful alacrity, creates an appetite, and promotes digeftion. Thefe exercifes are more efpecially ferviceable to weak people; but, in order to ftrengthen the body by mufcular motion, running and bodily exercifes are to be ufed. In thefe we fhould begin with the moft gentle, fuch as walking, and increafe it by degrees till we come to running. Thofe exercifes of the body are more efpecially ferviceable which give delight to the mind at the fame time, as tennis, fencing, &c. for which reafon, the wifdom of antiquity appointed rewards for thofe who excelled in thefe gymnaftic exercifes, that by this means the bodies of their youth might be hardened for warlike toils.

As nothing is more conducive to health than moderate exercife, fo violent exercife diffipates the fpirits, weakens the body, deftroys the elafticity of the fibres, and exhaufts the fluid parts of the blood. No wonder, then, that acute and mortal fevers often arife from too violent exercife of the body; for the motion of the venous blood towards the heart being quickened by the contraction of the mufcles, and the veins being thus depleted, the arteries more eafily propel their contained humours through the fmalleft extremities into the now lefs-refifting veins; and therefore the velocity of the circulation will be increafed through all the veffels. But this cannot be performed without applying the humours oftener, or in a greater quantity, to the fecretory organs in the fame time, whence the more fluid parts of the blood will be diffipated, and what remains will be infpiffated; and, by the greater action of the veffels upon their contained fluids, and of the re-acting fluids upon the veffels, the blood acquires an inflammatory denfity. Add to this, that by the violent attrition of the folids and fluids, together with the heat thence arifing, all the humours will incline to a greater acrimony, and the falts and oils of the blood will become more acrid and volatile. Hence thofe fevers which arife from too much exercife or motion, are cured by the reft of body and mind, with fuch aliments and medicines as moiften, dilute, and foften or allay acrimony.

The exercife of a foldier in camp, confidered as conducive to health, Dr. Pringle diftinguifhes into three heads; the firft relating to his duty, the fecond to his

living more commodiouſly, and the third to his diverſions. The firſt, conſiſting chiefly in the exerciſe of his arms, will be no leſs the means of preſerving health than of making him expert in his duty: and frequent returns of this, early, and before the ſun grows hot, will be more advantageous than repeating it ſeldom, and ſtaying out long at a time; for, a camp affording little convenience for refreſhment, all unneceſſary fatigue is to be avoided. As to the ſecond article, cutting boughs for ſhading the tents, making trenches round them for carrying off the water, airing the ſtraw, cleaning their clothes and accoutrements, and aſſiſting in the buſineſs of the meſs, ought to be no diſagreeable exerciſe to the men for ſome part of the day. Laſtly, as to diverſions, the men muſt be encouraged to them either by the example of their officers, or by ſmall premiums to thoſe who ſhall excel in ſuch kind of ſports as ſhall be judged moſt conducive to health: but herein great caution is neceſſary, not to allow them to fatigue themſelves too much, eſpecially in hot weather or ſickly times; but above all, that their clothes be kept dry, wet clothes being frequent cauſes of diſeaſes and death.

Exerciſe, above all, is peculiarly neceſſary to the philoſopher, the ſtudent, and young gentlemen at ſchool. How uſeful, how agreeable ſoever, ſtudy may be to the mind, it is very far from being equally ſalutary to the body. Every one obſerves, that the Creator has formed an intimate connection between the body and the mind; a perpetual action and re-action, by which the body inſtantly feels the diſorders of the mind, and the mind thoſe of the body. The delicate ſprings of our frail machines loſe their activity and become enervated, and the veſſels are choaked by obſtructions, when we totally deſiſt from exerciſe; and the conſequences neceſſarily affect the brain: a life entirely ſtudious and ſedentary is therefore equally prejudicial to body and mind. The limbs likewiſe become ſtiff; we contract an aukward conſtrained manner; a certain diſguſtful air attends all our actions, and we are very near being as diſagreeable to ourſelves as to others. An inclination to ſtudy is highly commendable; but it ought not, however, to inſpire us with an averſion to ſociety. The natural lot of man is to live among his fellows: and, whatever may be the condition of our birth or our ſituation in life, there are a thouſand occaſions where a man muſt naturally deſire to render himſelf agreeable; to be active and adroit; to dance with a grace; to command the fiery ſteed; to defend himſelf againſt a brutal enemy; to preſerve his life by dexterity, as by leaping, ſwimming, &c. Many rational cauſes have therefore given riſe to the practice of particular exerciſes; and the moſt ſagacious and benevolent legiſlators have inſtituted, in their academies and univerſities, proper methods of enabling youth, who devote themſelves to ſtudy, to become expert alſo in laudable athletic exerciſes.

Whoever conſiders the ſtructure of the human body will ſoon be convinced of the neceſſity of exerciſe for the health of children. The body is compoſed of an infinite number of veſſels, whoſe fluids cannot be puſhed on without the action and preſſure of the muſcles. But, if the fluids remain inactive, obſtructions muſt happen, and the humours will, of courſe, be vitiated, which cannot fail to occaſion diſeaſes. Nature has furniſhed both the veſſels which carry the blood and lymph with numerous valves, in order that the action of every muſcle might puſh forward their contents; but, without action, this admirable contrivance can have no effect. This part of the animal œconomy proves to a demonſtration the neceſſity of exerciſe for the preſervation of health. Without exerciſe, the circulation of the blood cannot be properly carried on, nor the different ſecretions duly performed; without exerciſe, the humours cannot be properly prepared, nor the ſolids rendered ſtrong or firm. The action of the heart, the motion of the lungs, and all the vital functions, are greatly aſſiſted by exerciſe. But to point out the manner in which theſe effects are produced, would lead us farther into the œconomy of the human body than moſt of thoſe for whom this treatiſe is intended would be able to follow. We ſhall therefore only add, that, where exerciſe is neglected, none of the animal functions can be duly performed; and, when that is the caſe, the whole conſtitution muſt go to wreck.

The love of activity ſhows itſelf very early in man. So ſtrong is this principle, that a healthy youth cannot be reſtrained from exerciſe, even by the fear of puniſhment. Our love of motion is ſurely a ſtrong proof of its utility. Nature implants no diſpoſition in vain. It ſeems to be a catholic law throughout the whole animal creation, that no creature, without exerciſe, ſhould enjoy health, or be able to find ſubſiſtence. Every creature, except man, takes as much of it as is neceſſary. He alone, and ſuch animals as are under his direction, deviate from this original law; and they ſuffer accordingly. Inactivity never fails to induce an univerſal relaxation of the ſolids, which diſpoſes the body to innumerable diſeaſes. When the ſolids are relaxed, neither the digeſtion nor any of the ſecretions can be duly performed. In this caſe, the worſt conſequences muſt enſue. How can perſons who loll all day in eaſy chairs, and ſleep all night on beds of down, fail to be relaxed? Nor do ſuch greatly mend the matter, who never ſtir abroad but in a coach, ſedan, or ſuch like. Theſe elegant pieces of luxury are become ſo common, that the inhabitants of great towns ſeem to be in ſome danger of loſing the uſe of their limbs altogether. It is now below any one to walk, who can afford to be carried. How ridiculous would it ſeem, to a perſon unacquainted with modern luxury, to behold the young and healthy ſwinging along on the ſhoulders of their fellow-creatures! or to ſee a fat carcaſe, over-run with diſeaſes occaſioned by inactivity, dragged through the ſtreets by half a dozen horſes!

Glandular

Glandular obſtructions, now ſo common, generally proceed from inactivity. Theſe are the moſt obſtinate of maladies. So long as the liver, kidneys, and other glands, duly perform their functions, health is ſeldom impaired; but, when they fail, nothing can reſtore it. Exerciſe is almoſt the only cure we know for glandular obſtructions; indeed, it does not always ſucceed as a *remedy;* but there is reaſon to believe that it would ſeldom fail to *prevent* theſe complaints, were it uſed in due time. One thing is certain, that, amongſt thoſe who take ſufficient exerciſe, glandular diſeaſes are very little known; whereas the indolent and inactive are ſeldom free from them. Weak nerves are the conſtant companions of inactivity. Nothing but exerciſe and open air can brace and ſtrengthen the nerves, or prevent the endleſs train of diſeaſes which proceed from a relaxed ſtate of theſe organs. We ſeldom hear the active or laborious complain of nervous diſeaſes; theſe are reſerved for the ſons of eaſe and affluence. Many have been completely cured of theſe diſorders by being reduced from a ſtate of opulence to labour for their daily bread. This plainly points out the ſources from whence nervous diſeaſes flow, and the means by which they may be prevented. It is abſolutely impoſſible to enjoy health, where the perſpiration is not duly carried on; but that can never be the caſe where exerciſe is neglected. When the matter which ought to be thrown off by perſpiration is retained in the body, it vitiates the humours, and occaſions the gout, fevers, rheumatiſm, &c. Exerciſe alone would prevent many of thoſe diſeaſes which cannot be cured, and would remove others where medicine proves ineffectual.

No piece of indolence hurts the health more than the modern cuſtom of lying a-bed too long in a morning. This is the general practice in great towns. The inhabitants of cities ſeldom riſe before nine or ten o'clock; but the morning is undoubtedly the beſt time for exerciſe, while the ſtomach is empty, and the body refreſhed with ſleep. Beſides, the morning air braces and ſtrengthens the nerves, and, in ſome meaſure, anſwers the purpoſe of a cold bath. Let any one who has been accuſtomed to lie a-bed late, riſe by ſix or ſeven, ſpend a couple of hours in walking, riding, or any active diverſion without doors, and he will find his ſpirits cheerful and ſerene through the day, his appetite keen, and his body braced and ſtrengthened. Cuſtom ſoon renders early riſing agreeable, and nothing contributes more to the preſervation of health. The inactive are continually complaining of pains of the ſtomach, flatulencies, indigeſtions, &c. Theſe complaints, which pave the way to many others, are not to be removed by medicine: they can only be cured by a vigorous courſe of exerciſe, to which they ſeldom fail to yield.

Exerciſe, if poſſible, ought always to be taken in the open air. When that cannot be done, various methods may be contrived for exerciſing the body within doors.

doors. It is not neceſſary to adhere ſtrictly to any particular kind of exerciſe. The beſt way is to take them by turns, and to uſe that longeſt which is moſt ſuitable to the ſtrength and conſtitution. Thoſe kinds of exerciſe which give action to moſt of the bodily organs, are always to be preferred, as walking, running, riding, digging, ſwimming, and ſuch like. It is much to be regretted, that active and manly diverſions are now ſo little practiſed. Diverſions make people take more exerciſe than they otherwiſe would do, and are of the greateſt ſervice to ſuch as are not under the neceſſity of labouring for their bread. As active diverſions loſe ground, thoſe of a ſedentary kind ſeem to prevail. Sedentary diverſions are of no other uſe but to conſume time. Inſtead of relieving the mind, they often require more thought than either ſtudy or buſineſs. Every thing that induces people to ſit ſtill, unleſs it be ſome neceſſary employment, ought to be avoided.

The diverſions which afford the beſt exerciſe are hunting, ſhooting, playing at cricket, bowls, &c. Theſe exerciſe the limbs, promote perſpiration, and the other ſecretions. They likewiſe ſtrengthen the lungs, and give firmneſs and agility to the whole body. Such as can, ought to ſpend two or three hours a-day on horſeback; thoſe who cannot ride, ſhould employ the ſame time in walking. Exerciſe ſhould never be continued too long. Over-fatigue prevents the benefit of exerciſe, and inſtead of ſtrengthening the body tends to weaken it. Every man ſhould lay himſelf under ſome ſort of neceſſity to take exerciſe. Indolence, like other vices, when indulged, gains ground, and at length becomes agreeable. Hence many who were fond of exerciſe in the early part of life, become quite averſe from it afterwards. This is the caſe of moſt hypochondriac and gouty people, which renders their diſeaſes in a great meaſure incurable. Indolence not only occaſions diſeaſes, and renders men uſeleſs to ſociety, but promotes all manner of vice. To ſay a man is lazy, is little better than calling him vicious. The mind, if not engaged in ſome uſeful purſuit, is conſtantly in queſt of ideal pleaſures, or impreſſed with the apprehenſion of ſome imaginary evil. From theſe ſources proceed moſt of the miſeries of mankind. Certainly man was never intended to be idle. Inactivity fruſtrates the very deſign of his creation: whereas an active life is the beſt guardian of virtue, and the greateſt preſervative of health.

Of SLEEP.

SLEEP, as well as food, ought to be duly regulated. Too little ſleep weakens the nerves, exhauſts the ſpirits, and occaſions diſeaſes; and too much renders the mind dull, the body groſs, and diſpoſes to apoplexies, lethargies, and other complaints of a ſimilar nature. A medium ought therefore to be obſerved; but this is not eaſy to fix. Children require more ſleep than grown perſons, the laborious than

than the idle, and ſuch as eat and drink freely than thoſe who live abſtemiouſly. Beſides, the real quantity of ſleep cannot be meaſured by time, as one perſon will be more refreſhed by five or ſix hours ſleep than another by eight or ten. Children may always be allowed to take as much ſleep as they pleaſe; but, for adults, ſix or ſeven hours are certainly ſufficient, and no one ought to exceed eight. Thoſe who lie a-bed more than eight hours may ſlumber, but they can be hardly ſaid to ſleep; ſuch generally toſs and dream away the fore part of the night, ſink to reſt towards morning, and doze till noon. The beſt way to make ſleep ſound and refreſhing is to riſe betimes. The cuſtom of lying a-bed for nine or ten hours, not only makes the ſleep leſs refreſhing, but weakens the conſtitution. Nature points out night as the proper ſeaſon for ſleep. Nothing more certainly deſtroys the conſtitution than night-watching. It is a great pity that a practice ſo deſtructive to health ſhould be ſo much in faſhion. How quickly the want of reſt in due ſeaſon will blaſt the moſt blooming complexion, or ruin the beſt conſtitution, is evident from the ghaſtly countenances of thoſe who, as the phraſe is, turn day into night, and night into day. To make ſleep refreſhing, the following things are requiſite: Firſt, to take ſufficient exerciſe in the open air; to avoid ſtrong tea or coffee; next, to eat a light ſupper; and laſtly, to lie down with a mind as cheerful and ſerene as poſſible.

It is certain that too much exerciſe will prevent ſleep, as well as too little. We ſeldom, however, hear the active and laborious complain of reſtleſs nights. It is the indolent and ſlothful who generally have theſe complaints. Is it any wonder that a bed of down ſhould not be refreſhing to a perſon who ſits all day in an eaſy chair? A great part of the pleaſure of life conſiſts in alternate reſt and motion; but they who neglect the latter can never reliſh the former. The labourer enjoys more true luxury in plain food and ſound ſleep, than is to be found in ſumptuous tables and downy pillows, where exerciſe is wanting. That light ſuppers cauſe ſound ſleep, is true even to a proverb. Many perſons, if they exceed the leaſt at that meal, are ſure to have uneaſy nights; and, if they fall aſleep, the load and oppreſſion on their ſtomach and ſpirits occaſion frightful dreams, broken and diſturbed repoſe, the night-mare, &c. Were the ſame perſons to go to bed with a light ſupper, or ſit up till that meal was pretty well digeſted, they would enjoy ſound ſleep, and riſe refreſhed and cheerful. There are indeed ſome people who cannot ſleep unleſs they have ſome ſolid food at night; but this does not imply the neceſſity of a heavy ſupper.

Nothing more certainly diſturbs our repoſe than anxiety. When the mind is not at eaſe, one ſeldom enjoys ſound ſleep. That greateſt of human bleſſings flies the wretched, and viſits the happy, the cheerful, and the gay. This is a ſufficient

reaſon why every man ſhould endeavour to be as eaſy in his mind as poſſible when he goes to reſt. Many, by indulging grief and anxious thought, have baniſhed ſound ſleep ſo long, that they could never afterwards enjoy it. Sleep, when taken in the fore part of the night, is generally reckoned moſt refreſhing. Whether this be the effect of habit or not is hard to ſay; but, as moſt people are accuſtomed to go early to bed when young, it may be preſumed that ſleep, at this ſeaſon, will prove moſt refreſhing to them ever after. Whether the fore part of the night be beſt for ſleep or not, ſurely the fore part of the day is fitteſt both for buſineſs and amuſement; and we hardly ever find an early-riſer who does not enjoy a good ſtate of health.

Experience proves that, the more a perſon ſleeps, the more he is inclined to ſleep: if in the morning we ſleep an hour beyond our cuſtom, the conſequence is, that we ſhall be dull and heavy all the day; and, as to theſe facts, there are ſome very remarkable.—A youth in Germany, of immenſe wealth, was ſummoned by his prince to take up a title of nobility; on which occaſion he drank to ſuch an exceſs, that the prince, in order to cure him of ſuch a ſcandalous vice, had him carried into a dark and remote place, where he ſlept three days and three nights; for, whenever he awoke, believing it to be the middle of the night, he betook himſelf to ſleep again.—The Memoirs of the Academy of Sciences at Paris mention a ſleep of two months, cauſed by a catalepſy, a diſeaſe by which the patient is inſtantly rendered as immoveable as a ſtatue.—Samuel Chilton, a labourer in Somerſetſhire, fell, and without any viſible cauſe, into a profound ſleep, out of which no means could recover him, till, after a month's time, he aroſe of himſelf. His mother, fearing he would be ſtarved in that ſullen humour, as ſhe called it, put bread and cheeſe and ſmall beer by him, and it was daily ſpent. On the ninth of April, 1696, he was ſeized with a like ſleepy fit, which laſted till the ſeventh of Auguſt, when he awoke, without knowing he had ſlept above a night. He occaſionally uſed the food ſet by him, and had evacuations, till, about the tenth week, his jaws ſeemed to be ſet, and his teeth clinched ſo cloſe that his mouth could not be opened; and all the nouriſhment he received, during theſe ſeven weeks, was about three pints of tent inſinuated through a cavity in one of his teeth. He had made water but once, and never had a ſtool all the time. On the 17th of Auguſt, 1697, his fit returned; and Dr. Oliver, the author of the memoir, in order to try whether there might not be ſome impoſture in this extraordinary phenomenon, went to the houſe; he put his mouth to his ear, and called him ſeveral times, by his name, as loud as he could; pulled him by the ſhoulders, pinched his noſe, ſtopped his mouth and noſe at the ſame time; lifted up his eye-lids, when he found the balls drawn up under the brows; he, farther, held a phial of ſpirit of ſal ammoniac

niac under one noſtril; that producing no effect, he poured up his noſe near a half-ounce bottle, and the ſpirit, he ſays, being drawn from quicklime, was almoſt as hot as fire itſelf. Not ſatisfied with this, he crammed the ſame noſtril with powder of white hellebore: all theſe experiments producing no other effect than to make his eyes ſhiver a little. Dr. Oliver left him, convinced that he was really aſleep. A few days after, an apothecary drew ſome ounces of blood from his arm, and bound up the orifice, without his making the leaſt motion: likewiſe, a gentleman, though ſomewhat indiſcreetly, ran a pin into his arm, up to the very bone; and in this ſtate of inſenſible ſleep he continued till the nineteenth of November; during all this time he ate and evacuated, but never fouled his bed. The above inſtance of ſleep is to be seen at large in Jones's Abridgement of the Philoſophical Tranſactions, vol. v.

Of DREAMS.

SCARCELY any part of nature is leſs open to our obſervation than the human mind in this ſtate. The dreamer himſelf cannot well obſerve the manner in which dreams ariſe or diſappear to him. When he awakes, he cannot recollect the circumſtances of his dreams with ſufficient accuracy. Were we to watch over him with the moſt vigilant attention, we could not perceive with certainty what emotions are excited in his mind, or what thoughts paſs through it, during his ſleep. But, even though we could aſcertain theſe phenomena, many other difficulties would ſtill remain. What parts of a human being are active, what dormant, when he dreams? Why does he not always dream while aſleep? Or why dreams he at all? Do any circumſtances in our conſtitution, ſituation, and peculiar character, determine the nature of our dreams? We may lay before the reader ſuch facts as have been aſcertained concerning dreaming, and the moſt plauſible conjectures that have been offered to explain thoſe particulars, about which we can only conjecture, or have at leaſt hitherto obtained nothing more certain than conjecture.

In dreaming, we are not conſcious of being aſleep. This is well known from a thouſand circumſtances. When awake, we often recollect our dreams; and we remember on ſuch occaſions, that, while thoſe dreams were paſſing through our minds, it never occurred to us that we were ſeparated by ſleep from the active world. We are often obſerved to act and talk in dreaming as if we were buſily engaged in the intercourſe of ſocial life. In dreaming we do not conſider ourſelves as witneſſing or bearing a part in a fictitious ſcene; we ſeem not to be in a ſimilar ſituation with the actors in a dramatic performance, or the ſpectators before whom they exhibit, but engaged in the buſineſs of real life. All the varieties of thought that paſs through our minds when awake may alſo occur in dreams; all the images

which imagination preſents in the former ſtate ſhe is alſo able to call up in the latter all the ſame emotions may be excited, and we are often actuated by equal violence of paſſion; none of the tranſactions in which we are capable of engaging while awake is impoſſible in dreams: in ſhort, our range of action and obſervation is equally wide in one ſtate as in the other; and, while dreaming, we are not ſenſible of any diſtinction between our dreams and the events and tranſactions in which we are actually concerned in our intercourſe with the world.

Though in dreams imagination appears to be free from all reſtraint, and indulges in the moſt wanton freaks, yet it is generally agreed, that the imaginary tranſactions of the dreamer bear always ſome relation to his particular character in the world, his habits of action, and the circumſtances of his life. The lover, we know, dreams of his miſtreſs, and the miſer of his money; the philoſopher renews his reſearches in ſleep often with the ſame pain and fatigue as when awake; and even the merchant, at times, returns to balance his books, and compute the profits of an adventure, when ſlumbering on his pillow. And not only do the more general circumſtances of a perſon's life influence his dreams; his paſſions and habits are nearly the ſame when aſleep as when awake. *A perſon whoſe habits of life are virtuous, does not in his dreams plunge into a ſeries of crimes; nor are the vicious reformed when they paſs into this imaginary world.* The choleric man finds himſelf offended by ſlight provocations as well in his dreams as in his ordinary intercourſe with the world, and a mild temper continues pacific in ſleep. The character of a perſon's dreams is influenced by his circumſtances when awake in a ſtill more unaccountable manner. Certain dreams uſually ariſe in the mind after a perſon has been in certain ſituations. Dr. Beattie relates, that he once, after riding thirty miles in a high wind, paſſed a part of the ſucceeding night in dreams beyond deſcription terrible. The ſtate of a perſon's health, and the manner in which the vital functions are carried on, have a conſiderable influence in determining the character of dreams. After too full a meal, or after eating of an unuſual ſort of food, a perſon has always dreams of a certain nature. In dreaming, the mind for the moſt part carries on no intercourſe through the ſenſes with ſurrounding objects. Touch a perſon gently who is aſleep, he feels not the impreſſion. You may awake him by a ſmart blow; but, when the ſtroke is not ſufficiently violent to effect that, he remains inſenſible of it. We ſpeak ſoftly beſide a perſon aſleep without fearing that he overhears us. His eye-lids are ſhut; and, even though light ſhould fall upon the eye-ball, yet ſtill his powers of viſion are not awakened to active exertion, unleſs the light be ſo ſtrong as to rouſe him from ſleep. He is inſenſible both to ſweet and diſagreeable ſmells. It is not eaſy to try whether his organs of taſte retain their activity, without awakening him; yet from analogy it may be preſumed that

that theſe too are inactive. With reſpect to the circumſtances here enumerated, it is indifferent whether a perſon be dreaming or buried in ſleep.

Yet there is one remarkable fact concerning dreaming which may seem to contradict what has been here aſſerted. In dreams, we are liable not only to ſpeak aloud in conſequence of the ſuggeſtions of imagination, but even to get up, and walk about, and engage in little enterpriſes, without awaking. Now, as we are in this inſtance ſo active, it ſeems that we cannot be then inſenſible of the preſence of ſurrounding objects. The ſleep-walker is really ſenſible, in a certain degree, of the preſence of the objects around him; but he does not attend to them with all their circumſtances, nor do they excite in him the ſame emotions as if he were awake. He feels no terror on the top of a houſe, or the brink of a precipice; and, in conſequence of being free from fear, he is alſo without danger in ſuch a ſituation, unleſs ſuddenly awaked. This is one of the moſt inexplicable phenomena of dreaming. There is alſo another fact not quite conſonant with what has been above advanced. It is ſaid, that in ſleep a perſon will continue to hear the noiſe of a cataract in the neighbourhood, or regular ſtrokes with a hammer, or any ſimilar ſound ſufficiently loud, and continued uninterruptedly from before the time of his falling aſleep. We know not whether he awakes on the ſudden ceſſation of the noiſe. This fact is aſſerted on ſufficient evidence: it is curious. Even when awake, if very deeply intent on any piece of ſtudy, or cloſely occupied in buſineſs, the ſound of a clock ſtriking in the neighbourhood, or the beating of a drum, will eſcape us unnoticed: and it is therefore the more ſurpriſing that we ſhould thus continue ſenſible to ſounds when aſleep. Not only do a perſon's general character, habits of life, and ſtate of health, influence his dreams; but thoſe concerns in which he has been moſt deeply intereſted during the preceding day, and the views which have ariſen moſt frequently to his imagination, very often afford the ſubjects of his dreams. When I look forward with anxious expectation towards any future event, I am likely to dream either of the diſappointment or the gratification of my wiſhes. Have I been engaged through the day, either in buſineſs or amuſements which I have found exceedingly agreeable, or in a way in which I have been extremely unhappy, either my happineſs or my miſery is likely to be renewed in my dreams. Though dreams have been regarded among almoſt all nations through the world, at leaſt in ſome periods of their hiſtory, as prophetic of future events, yet it does not appear that this popular opinion has been eſtabliſhed on good grounds. Chriſtianity, indeed, teaches us to believe, that the Supreme Being may, and actually does, operate on our minds, and influence at times the determinations of our will, without making us ſenſible of the reſtraint to which we are thus ſubjected. And, in the ſame manner, no doubt, the ſuggeſtions which ariſe to us in dreams may be

produced. The imaginary tranſactions in which we are then engaged, may be ſuch as are actually to occupy us in life; the ſtrange and ſeemingly incoherent appearances which are then preſented to the mind's eye, may allude to ſome events which are to befal ourſelves or others. It is, therefore, by no means impoſſible, or inconſiſtent with the general analogy of nature, that dreams ſhould have a reſpect to futurity. We have no reaſon to regard the dreams which are related in the Holy Scriptures to have been prophetic of future events as not inſpired by heaven, or to laugh at the idea of a prophetic dream as abſurd or ridiculous.

We know of no other facts that have been fully aſcertained concerning dreaming. But we are by no means ſufficiently acquainted with this important phenomenon in the hiſtory of the mind. We cannot tell by what laws of our conſtitution we are thus liable to be ſo frequently engaged in imaginary tranſactions, nor what are the particular means by which the deluſion is accompliſhed. The deluſion is indeed remarkably ſtrong. One will ſometimes have a book preſented to him in a dream, and fancy that he reads, and actually enter into the nature of the compoſition before him, and even remember, after he awakes, what he knows that he only fancied himſelf reading. Can this be deluſion? If deluſion, how or for what purpoſes is it produced? The mind, it would appear, does not, in ſleep, become inactive like the body; or at leaſt is not always inactive while we are aſleep. When we do not dream, the mind muſt either be inactive, or the connection between the mind and the body muſt be conſidered as in ſome manner ſuſpended: and, when we dream, the mind, though it probably acts in concert with the body, yet does not act in the ſame manner as when we are awake. It ſeems to be clouded or bewildered, in conſequence of being deprived for a time of the ſervice of the ſenſes. Imagination becomes more active and more capricious: and all the other powers, eſpecially judgment and memory, become diſordered and irregular in their operation.

Various theories have been propoſed to explain what appears here moſt inexplicable. The ingenious Mr. Baxter, in his treatiſe on the Immateriality of the Human Soul, endeavours to prove that dreams are produced by the agency of ſome ſpiritual beings, who either amuſe or employ themſelves ſeriouſly in engaging mankind in all thoſe imaginary tranſactions with which they are employed in dreaming. This theory, however, is far from being plauſible. It leads us entirely beyond the limits of our knowledge. It requires us to believe without evidence. It is unſupported by any analogy. It creates difficulties ſtill more inexplicable than thoſe which it has been propoſed to remove. Till it appear that our dreams cannot poſſibly be produced without the interference of other ſpiritual agents, poſſeſſing ſuch influence over our minds as to deceive us with fancied joys, and involve

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us in imaginary afflictions, we cannot reaſonably refer them to ſuch a cauſe. Beſides, from the facts which have been ſtated as well known concerning dreams, it appears that their nature depends both on the ſtate of the human body and on that of the mind. But, were they owing to the agency of other ſpiritual beings, how could they be influenced by the ſtate of the body? Thoſe muſt be a curious ſet of ſpiritual beings who depend in ſuch a manner on the ſtate of our corporeal frame. Better not to allow them exiſtence at all, than to place them in ſuch a dependance.

Wolfius, and after him M. Formey, have ſuppoſed, that dreams never ariſe in the mind except in conſequence of ſome of the organs of ſenſation having been previouſly excited. Either the ear or the eye, or the organs of touching, taſting, or ſmelling, communicate information, ſomehow, in a tacit, ſecret, manner; and thus partly rouſe its faculties from the lethargy in which they are buried in ſleep, and engage them in a ſeries of confuſed and imperfect exertions. But what paſſes in dreams is ſo very different from all that we do when awake, that it is impoſſible for the dreamer himſelf to diſtinguiſh whether his powers of ſenſation perform any part on the occaſion. It is not neceſſary that imagination be always excited by ſenſation. Fancy, even when we are awake, often wanders from the preſent ſcene. Abſence of mind is incident to the ſtudious; the poet and the mathematician many times forget what they are. We cannot diſcover, from any thing that a perſon in dreaming diſplays to the obſervation of others, that his organs of ſenſation take a part in the imaginary tranſactions in which he is employed. In thoſe inſtances, indeed, in which perſons aſleep are ſaid to hear ſounds; the ſounds which they hear are ſaid alſo to influence, in ſome manner, the nature of their dreams. But ſuch inſtances are ſingular. Since then it appears that the perſon who dreams is himſelf incapable of diſtinguiſhing either during his dreams, or by recollection when awake, whether any new impreſſions are communicated to him in that ſtate by his organs of ſenſation; that even by watching over him, and comparing our obſervations of his circumſtances and emotions, in his dreams, with what he recollects of them after awaking, we cannot, except in one or two ſingular inſtances, aſcertain this fact; and that the mind is not incapable of acting while the organs of ſenſation are at reſt, and on many occaſions refuſes to liſten to the information which they convey; we may, without heſitation, conclude, that the theory of Wolfius and Formey has been too haſtily and incautiouſly advanced.

Other phyſiologiſts tell us, that the mind, when we dream, is in a ſtate of delirium. Sleep, they ſay, is attended with what is called a collapſe of the brain; during which either the whole or a part of the nerves of which it conſiſts, are in a ſtate in which they cannot carry on the uſual intercourſe between the mind and the organs of ſenſation. When the whole of the brain is in this ſtate, we become en-

tirely unconſcious of exiſtence, and the mind ſinks into inactivity: when only a part of the brain is collapſed, as they term it, we are then neither aſleep nor awake, but in a ſort of delirium between the two. This theory, like the laſt-mentioned, ſuppoſes the mind incapable of acting without the help of ſenſation: it ſuppoſes that we know the nature of a ſtate of which we cannot aſcertain the phenomena; it alſo contradicts a known fact, in repreſenting dreams as confuſed images of things around us, not fanciful combinations of things not exiſting together in nature or in human life. We muſt conſider it likewiſe, therefore, as a baſeleſs fabric.

Inſtead of the attendant ſpirits watching over our bodies, and inciting us to good or evil in our dreams, may we not more rationally ſuppoſe, that theſe incitements, or rather exertions towards real and ſenſible actions, are produced by the ſoul or ſpirit within us, which, being immortal, never ſleeps; but which rather, during that paſſive ſtate of the body, aſſumes an endeavour to act without it, or to eſcape from it, as from a priſon, wherein it is reſtrained to certain limits, and obliged to act under the will of its keeper. This ſurely will beſt explain the facts attending ſleep-walkers, who, in the darkeſt nights viſit different apartments, walk up and down ſtairs, lock and unlock doors, open windows, and crawl over the roofs of houſes, with the utmoſt eaſe and celerity; which, if the perſons were awake, would be impoſſible. May we not likewiſe attribute to the ſame ſource, thoſe elevated ideas, and ſublime compoſitions, which Milton and other celebrated authors have confeſſed, were communicated nightly in their dreams?

It lately happened, that a young gentlemen, about fifteen years of age, from one of the public ſchools, ſlept in the ſame room with me. He choſe to go to bed early; and, when I came into the ſame apartment about two hours after, he appeared remarkably intent upon his ſtudies, though faſt locked in the arms of ſleep. I ſtood ſome time at his bed-ſide, and heard him repeat ſeveral lines from Homer and Virgil. After this he repeated, with a bold and nervous accent, the whole of the Hebrew alphabet: then, turning, ſeemed to fall into a more compoſed ſleep. The next morning at breakfaſt I related this circumſtance to the company, in the preſence of the young gentleman; and all began to commend the great progreſs he muſt have made in his ſtudies. The young man inſtantly declared, that, however converſant he might be with Virgil and Homer, he had never heard the Hebrew alphabet repeated, nor did he ever know the name of any one of its characters.—The nature of the connection by which the ſoul and body are united, ſeems to be almoſt beyond our comprehenſion; and, till we can apply experiment and obſervation in a better manner to this branch of phyſiology,

phyſiology, it muſt undoubtedly remain unknown. To ſomething myſterious in the nature of that connection, the deluſion produced in dreams is in all probability owing.

Amid this uncertainty with reſpect to the manner in which our powers of mind and body perform their functions in dreaming, it is pleaſing to find that we can, however, apply to uſeful purpoſes the imperfect knowledge which we have been able to acquire concerning the ſeries of phenomena. Our dreams are affected by the ſtate of our health, by the manner in which we have paſſed the preceding day, by our general habits of life, by the hopes which we moſt fondly indulge, and the fears which prevail moſt over our fortitude when we are awake. From recollecting our dreams, therefore, we may learn to correct many improprieties in our conduct; to refrain from bodily exerciſes, or from meats and drinks, that have unfavorable effects on our conſtitution; to reſiſt in due time evil habits that are ſtealing upon us; and to guard againſt hopes and fears which detach us from our proper concerns, and unfit us for the duties of life. Inſtead of thinking what our dreams may forebode, we may, with much better reaſon, reflect by what they have been occaſioned, and look back to thoſe circumſtances in our paſt life to which they are owing. The ſleep of innocence and health is ſound and refreſhing; their dreams delightful and pleaſing. A diſtempered body, and a polluted or perturbed mind, are haunted in ſleep with frightful, impure, and unpleaſing, dreams.

Of INTEMPERANCE.

It is univerſally agreed, that temperance and exerciſe are the two beſt phyſicians in the world, and that, if theſe were duly regarded, there would be little occaſion for any other. *Temperance may juſtly be called the parent of health;* yet numbers of mankind act as if they thought diſeaſes and death too ſlow in their progreſs, and, by intemperance and debauch, ſeem, as it were, to ſolicit their approach. The danger of intemperance appears from the very conſtruction of the human body. Health depends on the ſtate of the ſolids and fluids which fits them for the due performance of the vital functions; and, while theſe go regularly on, we are ſound and well; but whatever diſturbs them neceſſarily impairs health. Intemperance never fails to diſorder the whole animal œconomy; it hurts the digeſtion, relaxes the nerves, renders the different ſecretions irregular, vitiates the humours, and occaſions numberleſs diſeaſes.

The analogy between the nouriſhment of plants and animals affords a ſtriking proof of the danger of intemperance. Moiſture and manure greatly promote vegetation; yet an over-quantity of either will entirely deſtroy it. The beſt things become hurtful, nay deſtructive, when carried to exceſs. Hence we learn, that

the higheſt degree of human wiſdom conſiſts in regulating our appetites and paſſions ſo as to avoid all extremes. It is this chiefly which entitles us to the character of rational beings. The ſlave of appetite will ever be the diſgrace of human nature.—The Supreme Being hath endued us with various paſſions for the propagation of the ſpecies, the preſervation of the individual, &c. Intemperance is the abuſe of theſe paſſions; and moderation conſiſts in the proper regulation of them. Men, not contented with ſatisfying the ſimple calls of Nature, create artificial wants, and are perpetually in ſearch of ſomething that may gratify them; but imaginary wants can never be gratified. *Nature is content with little; but luxury knows no bounds.* Hence the epicure, the drunkard, and the debauchee, ſeldom ſtop their career, till their money, or their conſtitution, fails: then, indeed, they generally ſee their error when too late.

It is impoſſible to lay down fixed rules with regard to diet, on account of the different conſtitutions of mankind. The moſt ignorant perſon, however, certainly knows what is meant by exceſs; and it is in the power of every man, if he chooſes, to avoid it. The great rule of diet is to ſtudy ſimplicity. Nature delights in the moſt plain and ſimple food; and every animal, except man, follows her dictates. Man alone riots at large, and ranſacks the whole creation in queſt of luxuries, to his own deſtruction. An elegant writer of the laſt age ſpeaks thus of intemperance in diet: "For my part, when I behold a faſhionable table ſet out in all its magnificence, I fancy that I ſee gouts and dropſies, fevers and lethargies, with other innumerable diſtempers, lying in ambuſcade among the diſhes." Nor is intemperance in other things leſs deſtructive than in diet. How quickly does the immoderate purſuit of carnal pleaſures, or the abuſe of intoxicating liquors, ruin the beſt conſtitution! Indeed theſe vices generally go hand in hand. Hence it is that we ſo often behold the votaries of Bacchus and Venus, even before they have arrive at the prime of life, worn out with diſeaſe, and haſting with ſwift pace to an untimely grave. Did men reflect on the painful diſeaſes, and premature deaths, which are daily occaſioned by intemperance, it would be ſufficient to make them ſhrink back with horror from the indulgence even of their darling pleaſures.

Intemperance does not hurt its votaries alone; the innocent too often feel the direful effects of it. How often do we behold the miſerable mother, with her helpleſs infants, pining in want, while the cruel father is indulging his inſatiate appetites? Families are not only reduced to miſery, but even extirpated, by intemperance. *Nothing tends ſo much to prevent propagation, and to ſhorten the lives of children, as the intemperance of parents.* The poor man who labours all day, and at night lies down contented with his humble fare, can boaſt a numerous offspring; while his pampered lord, ſunk in eaſe and luxury, often languiſhes without

without an heir to his ample fortunes. Even ſtates and empires feel the influence of intemperance, and riſe or fall as it prevails. Inſtead of mentioning the different kinds of intemperance, and pointing out their influence upon health, we ſhall only, by way of example, make a few obſervations on one particular ſpecies of that vice, viz. the abuſe of intoxicating liquors.

Every act of intoxication puts Nature to the expenſe of a fever, in order to diſcharge the poiſonous draught. When this is repeated almoſt every day, it is eaſy to foreſee the conſequences. That conſtitution muſt be ſtrong indeed, which is able long to hold out under a daily fever! *But fevers occaſioned by drinking do not always go off in a day; they frequently end in an inflammation of the breaſt, liver, or brain, and produce fatal effects.* Though the drunkard ſhould not fall by an acute diſeaſe, he ſeldom eſcapes thoſe of a chronic kind. Intoxicating liquors, when uſed to exceſs, weaken the bowels, and ſpoil the digeſtion; they deſtroy the power of the nerves, and occaſion paralytic and convulſive diſorders: they likewiſe heat and inflame the blood, deſtroy its balſamic quality, render it unfit for circulation, and for the nouriſhment of the body. Hence obſtructions, atrophies, dropſies, and conſumptions of the lungs. Theſe are the common ways in which drunkards make their exit. Diſeaſes of this kind, when brought on by hard drinking, ſeldom admit of a cure. *Many people injure their health by drinking, who ſeldom get drunk.* The continual habit of ſoaking, as it is called, though its effects be not ſo violent, is not leſs pernicious. When the veſſels are kept conſtantly full and upon the ſtretch, the different digeſtions can neither be duly performed, nor the humours properly prepared. Hence moſt people of this character are afflicted with the gout, the gravel, ulcerous ſores in the legs, &c. If theſe diſorders do not appear, they are ſeized with low ſpirits, hypochondriacal affections, and other ſymptoms of indigeſtion.

Conſumptions are now ſo common, that it is thought one-tenth of the inhabitants of great towns die of that diſeaſe. Hard drinking is no doubt one of the cauſes to which we muſt impute the increaſe of conſumptions. The great quantities of viſcid malt-liquor drunk by the common people of England cannot fail to render the blood ſizy and unfit for circulation; from whence proceed obſtructions and inflammations of the lungs. There are few great ale-drinkers who are not phthiſical; nor is that to be wondered at, conſidering the glutinous and almoſt indigeſtible nature of ſtrong ale. Thoſe who drink ardent ſpirits or ſtrong wines run ſtill greater hazard; theſe liquors heat and inflame the blood, and tear the tender veſſels of the lungs in pieces; yet, ſo great is the conſumption of them in this country, that one would almoſt be induced to think the inhabitants lived upon them. The habit of drinking proceeds frequently from misfortunes in life. The miſera-

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ble fly to it for relief. It affords them indeed a temporary eaſe. But alas! this ſolace is ſhort-lived; and, when it is over, the ſpirits ſink as much below their uſual tone as they had before been raiſed above it. Hence a repetition of the doſe becomes neceſſary; and every freſh doſe makes way for another, till the unhappy wretch becomes a ſlave to the bottle, and at length falls a ſacrifice to what at firſt perhaps was taken only as a medicine. No man is ſo dejected as the drunkard when his debauch is gone off. Hence it is, that thoſe who have the greateſt flow of ſpirits while the glaſs circulates freely, are of all others the moſt melancholy when ſober, and often put an end to their own miſerable exiſtence in a fit of ſpleen or ill humour.

Drunkenneſs not only proves deſtructive to health, but likewiſe to the faculties of the mind. It is ſtrange that creatures who value themſelves on account of a ſuperior degree of reaſon to that of brutes ſhould take pleaſure in ſinking ſo far below them. Were ſuch as voluntarily deprive themſelves of the uſe of reaſon to continue ever after in that condition, it would ſeem but a juſt puniſhment; and, though this be not the conſequence of one act of intoxication, it ſeldom fails to ſucceed a courſe of it. By a habit of drinking, the greateſt genius is often reduced to a mere idiot. *Intoxication is peculiarly hurtful to young perſons.* It heats their blood, impairs their ſtrength, and obſtructs their growth; beſides, the frequent uſe of ſtrong liquors in the early part of life deſtroys any benefit that might ariſe from them afterwards. *Thoſe who make a practice of drinking generous liquors when young, cannot expect to reap any benefit from them as a cordial in the decline of life.* Drunkenneſs is not only in itſelf a moſt abominable vice, but is an inducement to many others. There is hardly any crime ſo horrid that the drunkard will not perpetrate for the love of liquor. We have known mothers ſell their children's clothes, the food that they ſhould have eaten, and afterwards even the infants themſelves, in order to purchaſe the accurſed draught.

It is amazing that our improvements in arts, learning, and politeneſs, have not put the barbarous cuſtom of drinking to exceſs out of faſhion. It is indeed leſs common in South Britain than it was formerly: but it ſtill prevails very much in the North, where this relic of barbarity is miſtaken for hoſpitality. In Ireland, no man is ſuppoſed to entertain his gueſts well, who does not make them drunk. Forcing people to drink, is certainly the greateſt piece of rudeneſs that any man can be guilty of. Bravado, complaiſance, or mere good-nature, may induce a man to take his glaſs, if urged to it, at a time when he might as well take poiſon. The cuſtom of drinking to exceſs has long been out of faſhion in France; and, as it begins to loſe ground among the politer part of the Engliſh, we hope it will ſoon be baniſhed from every part of the united kingdom.

Of the PASSIONS.

THE paſſions have great influence both in the cauſe and cure of diſeaſes. How the mind affects the body, will, in all probability, ever remain a ſecret. It is ſufficient for us to know, that there is eſtabliſhed a reciprocal influence betwixt the mental and corporeal parts, and that whatever injures the one diſorders the other.

Of Anger.—The paſſion of anger ruffles the mind, diſtorts the countenance, hurries on the circulation of the blood, and diſorders the whole vital and animal functions. It often occaſions fevers, and other acute diſeaſes, and ſometimes even ſudden death. This paſſion is peculiarly hurtful to the delicate, and thoſe of weak nerves. I have known ſuch perſons frequently loſe their lives by a violent fit of anger, and would adviſe them to guard againſt the exceſs of this paſſion with the utmoſt care. It is not indeed always in our power to prevent being angry; but we may ſurely avoid harbouring reſentment in our breaſt. Reſentment preys upon the mind, and occaſions the moſt obſtinate chronical diſorders, which gradually waſte the conſtitution. Nothing ſhows true greatneſs of mind more than to forgive injuries: it promotes the peace of ſociety, and greatly conduces to our own eaſe, health, and felicity. Such as value health ſhould avoid violent guſts of anger as they would the moſt deadly poiſon. Neither ought they to indulge reſentment, but endeavour at all times to keep their minds calm and ſerene. Nothing tends ſo much to the health of the body as a conſtant tranquillity of mind. Add to this, the indecency of extravagent anger; how it renders us, whilſt it laſts, the ſcorn and ſport of all about us, of which it leaves us, when it ceaſes, ſenſible and aſhamed; the inconveniences and irretrievable miſconduct into which our irraſcibility has ſometimes betrayed us; the friendſhips it has loſt us; the diſtreſſes and embarraſſments in which we have been involved by it, and the ſore repentance which on one account or other it always coſts us.

Phyſicians and naturaliſts afford inſtances of very extraordinary effects of this paſſion.—Borrichius cured a woman of an inveterate tertian ague, which had baffled the art of phyſic, by putting the patient in a furious fit of anger. Valeriola made uſe of the ſame means, with the like ſucceſs, in a quartan ague.—The ſame paſſion has been equally ſalutary to paralytic, gouty, and even dumb, perſons; to which laſt it has ſometimes given the uſe of ſpeech. Etmuller gives divers inſtances of very ſingular cures wrought by anger; among others, he mentions a perſon laid up in the gout, who, being provoked by his phyſician, flew upon him, and was cured. It is true, the remedy is ſomewhat dangerous in the application, when a patient does not happen to uſe it with moderation. We meet with ſeveral in-

ſtances of princes to whom it has proved mortal; for example, Valentinian the Firſt, Wenceſlas, Matthias Corvinus king of Hungary, and others. There are alſo inſtances wherein it has produced the epilepſy, jaundice, cholera-morbus, diarrhœa, &c. In fact, this paſſion is of ſuch a nature, that it quickly throws the whole nervous ſyſtem into preternatural commotions, by a violent ſtricture of the nervous and muſcular parts; and ſurpriſingly augments not only the ſyſtole of the heart and of its contiguous veſſels, but alſo the tone of the fibrous parts in the whole body. It is alſo certain that this paſſion, by the ſpaſmodic ſtricture it produces in the parts, exerts its power principally on the ſtomach and inteſtines, which are highly nervous and membranous parts; whence the ſymptoms are more dangerous, in proportion to the greater conſent of the ſtomach and inteſtines with the other nervous parts, and almoſt with the whole body. The unhappy influence of anger, likewiſe, on the biliary and hepatic ducts, is very ſurpriſing; ſince, by an intenſe conſtriction of theſe, the liver is not only rendered ſcirrhous, but ſtones alſo are often generated in the gall-bladder and biliary ducts; theſe accidents have ſcarcely any other origin than an obſtruction of the free motion and efflux of the bile, by means of this violent ſtricture. From ſuch a ſtricture of theſe ducts likewiſe proceeds the jaundice, which in proceſs of time lays a foundation for calculous concretions in the gall-bladder. Laſtly, by increaſing the motion of the fluids, or the ſpaſms of the fibrous parts, by means of anger, a larger quantity of blood is propelled with an impetus to certain parts; whence it happens that they are too much diſtended, and the orifices of the veins diſtributed there are too much opened. It is evident from experience, that anger has a great tendency to excite hæmorrhages, either from the noſe, the aperture of the pulmonary artery, the veins of the anus; or, in women, from the uterus, eſpecially in thoſe previouſly accuſtomed and diſpoſed to ſuch evacuations.

Of Fear.—The influence of fear, both in occaſioning and aggravating diſeaſes, is very great. No man ought to be blamed for a decent concern about life; but too great a deſire to preſerve it, is often the cauſe of loſing it. Fear and anxiety, by depreſſing the ſpirits, not only diſpoſe us to diſeaſes, but often render thoſe diſeaſes fatal which an undaunted mind would overcome. Sudden fear has generally violent effects. Epileptic fits, and other convulſive diſorders, are often occaſioned by it. Hence the danger of that practice, ſo common among young people, of frightening one another. Many have loſt their lives, and others have been rendered miſerable, by frolics of this kind. It is dangerous to tamper with the human paſſions. The mind may eaſily be thrown into ſuch diſorder as never again to act with regularity.

But

But the gradual effects of fear prove moſt hurtful. The conſtant dread of ſome future evil, by dwelling upon the mind, often occaſions the very evil itſelf. Hence it comes to paſs, that ſo many die of thoſe very diſeaſes of which they long had a dread, or which had been impreſſed on their minds by ſome accident or fooliſh prediction. This, for example, is often the caſe with women in child-bed. Many of thoſe who die in that ſituation are impreſſed with the notion of their death a long time before it happens; and there is reaſon to believe, that this impreſſion is often the cauſe of it. The methods taken to impreſs the minds of women with the apprehenſions of the great pain and peril of child-birth, are very hurtful. Few women die in labour, though many loſe their lives after it; which may be thus accounted for. A woman after delivery, finding herſelf weak and exhauſted, immediately apprehends ſhe is in danger; and this fear ſeldom fails to oſtruct the neceſſary evacuations upon which her recovery depends. Thus the ſex often fall a ſacrifice to their own imaginations, when there would be no danger, did they apprehend none. It ſeldom happens, when two or three women, in a great town, die in child-bed, but their death is followed by many others. Every woman of their acquaintance who is with child dreads the ſame fate, and the diſeaſe becomes epidemical by the mere force of imagination. This ſhould induce pregnant women to deſpiſe fear, and by all means to avoid thoſe tattling goſſips who are continually buzzing in their ears the misfortunes of others. Every thing that may in the leaſt alarm a patient, or a child-bed woman, ought with the greateſt care to be guarded againſt.

In general, the effects of terror are a contraction of the ſmall veſſels and a repulſion of the blood in the large and internal ones; hence proceed a ſuppreſſion of perſpiration, a general oppreſſion, trembling, and anguiſh of the heart and lungs, overcharged with blood. Frights often occaſion incurable diſeaſes, as epilepſy, ſtupor, madneſs, &c. In acute diſeaſes, they have evidently killed many, by the agitation into which they have thrown the ſpirits, already too much diſordered. We have alſo accounts of perſons abſolutely killed by terrors when in perfect health at the time of receiving the ſhock from them: people ordered to be executed, but with private orders for a reprieve, have expired at the block without a wound.

Out of many inſtances of the fatal effects of fear recorded in writers, the following is ſelected as one of the moſt ſingular. "George Grochantzy, a Polander, who had inliſted as a ſoldier in the ſervice of the King of Pruſſia, deſerted during the war. A ſmall party was ſent in purſuit of him; and, when he leaſt expected it, they ſurpriſed him ſinging and dancing among a company of peaſants, who were got together at an inn and were making merry. This event, ſo ſudden and unforeſeen, and at the ſame time ſo dreadful in its conſequences, ſtruck him in ſuch a manner,

manner, that, giving a great cry, he became at once altogether ſtupid and inſenſible, and was ſeized without the leaſt reſiſtance. They carried him away to Glogau, where he was brought before the council of war, and received ſentence as a deſerter. He ſuffered himſelf to be led and diſpoſed of at the will of thoſe about him, without uttering a word, or giving the leaſt ſign that he knew what had happened or would happen to him. He remained immoveable as a ſtatue wherever he was placed, and was wholly paſſive with reſpect to all that was done to him or about him. During all the time that he was in cuſtody, he neither ate, nor drank, nor ſlept, nor had any evacuation. Some of his comrades were ſent to ſee him; after that he was viſited by ſome officers of his corps and by ſome prieſts; but he ſtill continued in the ſame ſtate, without diſcovering the leaſt ſigns of ſenſibility. Promiſes, intreaties, and threatenings, were equally ineffectual. The phyſicians who were conſulted upon his caſe were of opinion, that he was in a ſtate of hopeleſs idiotcy. It was at firſt ſuſpected, that thoſe appearances were feigned; but theſe ſuſpicions neceſſarily gave way when it was known that he took no ſuſtenance, and that the involuntary functions of nature were in great meaſure ſuſpended. After ſome time they knocked off his fetters, and left him at liberty to go whither he would. He received his liberty with the ſame inſenſibility that he had ſhown on other occaſions: he remained fixed and immoveable; his eyes turned wildly here and there without taking cognizance of any object, and the muſcles of his face were fallen and fixed like thoſe of a dead body. Being left to himſelf, he paſſed twenty days in this condition, without eating, or having any evacuation, and died on the twentieth day. He had been ſometimes heard to fetch deep ſighs; and once he ruſhed with great violence on a ſoldier, who had a mug of liquor in his hand, forced the mug from him, and, having drank the liquor with great eagerneſs, let the mug drop to the ground."

When a perſon is affected with terror, the principal endeavour ſhould be to reſtore the circulation to its due order, to promote perſpiration, and to allay the agitation of the patient. For theſe purpoſes he may drink a little warm liquor, as camomile-tea, &c. the feet and legs may be put into warm water, the legs rubbed, and the camomile-tea repeated every ſix or eight minutes; and when the ſkin is warm, and there is a tendency to perſpiration, ſleep may be promoted by a gentle opiate. But frights have been known not only to cauſe, but alſo to cure, diſeaſes. Mr. Boyle mentions agues, gout, and ſciatica, cured by this means.

To turn from the ſerious to the ludicrous effects of fear, the following inſtance of the latter ſort, quoted from a French author by Mr. Andrews in his volume of Anecdotes, ſhows upon what ſlight occaſions this paſſion may be ſometimes excited in a very high degree, even in perſons the moſt unlikely to entertain ſuch a

gueſt. "Charles Guſtavus (the ſucceſſor of Chriſtina of Sweden) was beſieging Prague, when a boor of moſt extraordinary viſage deſired admittance to his tent; and, being allowed entrance, offered, by way of amuſing the king, to devour a whole hog of one hundred weight in his preſence. The old general Koningſmark, who ſtood by the king's ſide, and who, ſoldier as he was, had not got rid of the prejudices of his childhood, hinted to his royal maſter that the peaſant ought to be burnt as a ſorcerer. 'Sir,' ſaid the fellow, irritated at the remark, 'if your majeſty will but make that old gentleman take off his ſword and his ſpurs, I will eat him immediately, before I begin the hog.' General Koningſmark (who had, at the head of a body of Swedes, performed wonders againſt the Auſtrians, and who was looked upon as one of the braveſt men of the age) could not ſtand this propoſal, eſpecially as it was accompanied by a moſt hideous and preternatural expanſion of the frightful peaſant's jaws. Without uttering a word, the veteran ſuddenly turned round, ran out of the tent, nor thought himſelf ſafe until he had arrived at his own quarters, where he remained above twenty-four hours locked up ſecurely, before he got rid of the panic which had ſo ſeverely affected him."

Fear ſhould not riſe higher than to make us attentive and cautious; when it gains an aſcendency in the mind, it becomes an inſupportable tyranny, and renders life a burden. The object of fear is evil; and to be exempt from fear, or at leaſt not enſlaved to it, gives dignity to our nature, and invigorates all our faculties. Yet there are evils which we ought to fear. Thoſe that ariſe from ourſelves, or which it is in our power to prevent, it would be madneſs to deſpiſe, and audacity not to guard againſt. External evils, which we cannot prevent, or could not avoid without a breach of duty, it is manly and honourable to bear with fortitude. Inſenſibility to danger is not fortitude, any more than the incapacity of feeling pain can be called patience; and to expoſe ourſelves unneceſſarily to evil is worſe than folly, and very blameable preſumption.

Of IMPOTENCY occasioned by FEAR.

IT has been proved by Dr. Hunter, that impotency is frequently the reſult of fear. He obſerves, that as the "parts of generation are not neceſſary for the exiſtence or ſupport of the individual, but have a reference to ſomething elſe in which the mind has a principal concern; ſo a complete action in thoſe parts cannot take place without a perfect harmony of body and of mind: that is, there muſt be both a power of body and diſpoſition of mind; for the mind is ſubject to a thouſand alarms which affect the actions of theſe parts. Copulation is an act of the body, the ſpring of which is in the mind; but it is not volition: and according

to the ſtate of the mind, ſo is the act performed. To perform this act well, the body ſhould be in health, and the mind perfectly confident of the powers of the body: the mind ſhould be in a ſtate entirely diſengaged from every thing elſe; it ſhould have no difficulties, no fears, no apprehenſions, not even an anxiety to perform the act well; for even this anxiety is a ſtate of mind different from what ſhould prevail; there ſhould not be even a fear that the mind itſelf may find a difficulty at the time the act ſhould be performed. Perhaps no function of the machine depends ſo much upon the ſtate of the mind as this.—The will and reaſoning faculty have nothing to do with this power; they are only employed in the act, ſo far as voluntary parts are made uſe of; and if they ever interfere, which they ſometimes do, it often produces another ſtate of mind which deſtroys that which is proper for the performance of the act; it produces a deſire, a wiſh, a hope, which are all only diffidence and uncertainty, and create in the mind the idea of a poſſibility of the want of ſucceſs, which deſtroys the proper ſtate of mind, or neceſſary confidence.—There is perhaps no act in which a man feels himſelf more intereſted, or is more anxious to perform well; his pride being engaged in ſome degree, which, if within certain bounds, would produce a degree of perfection in an act depending upon the will, or an act in voluntary parts; but, when it produces a ſtate of mind contrary to that ſtate on which the perfection of the act depends, a failure muſt be the conſequence.—The body is not only rendered incapable of performing this act by the mind being under the above influence of fear, but alſo by the mind being, though perfectly confident of its power, yet conſcious of an impropriety in performing it; this, in many caſes, produces a ſtate of mind which ſhall take away all power. The ſtate of a man's mind reſpecting his ſiſter takes away all power. A conſcientious man has been known to loſe his powers on finding the woman he was going to be connected with unexpectedly a virgin.—Shedding tears ariſes entirely from the ſtate of the mind, although not ſo much a compound action as the act in queſtion; for none are ſo weak in body that they cannot ſhed tears; it is not ſo much a compound action of the mind and ſtrength of body joined, as the other act is; yet, if we are afraid of ſhedding tears, or are deſirous of doing it, and that anxiety is kept up through the whole of an affecting ſcene, we certainly ſhall not ſhed tears, or at leaſt not ſo freely as would have happened from our natural feelings."

From this account of the neceſſity of having the mind independent reſpecting the act, we muſt ſee that it may very often happen that the ſtate of mind will be ſuch as not to allow the animal to exert his natural powers; and every failure increaſes the evil. We muſt alſo ſee from this ſtate of the caſe, that this act muſt be often interrupted; and, the true cauſe of this interruption not being known, it will be

laid to the charge of the body, or want of powers. As theſe caſes do not ariſe from real inability, they are to be carefully diſtinguiſhed from ſuch as do; and perhaps the only way to diſtinguiſh them is, to examine into the ſtate of mind reſpecting this act. So trifling often is the circumſtance which ſhall produce this inability depending on fear, that the very deſire to pleaſe ſhall have that effect, as in making the woman the ſole object to be gratified.

Caſes of this kind we ſee every day; one of which I ſhall relate as an illuſtration of this ſubject, and alſo of the method of cure.—A gentleman told me, that he had loſt his virility. After above an hour's inveſtigation of the caſe, I made out the following facts: that he had at unneceſſary times ſtrong erections, which ſhowed that he had naturally this power; that the erections were accompanied with deſire, which are all the natural powers wanted; but that there was ſtill a defect ſomewhere, which I ſuppoſed to be from the mind. I inquired if all women were alike to him? His anſwer was, No; ſome women he could have connection with as well as ever. This brought the defect, whatever it was, into a ſmaller compaſs: and it appeared there was but one woman that produced this inability, and that it aroſe from a deſire to perform the act with this woman well; which deſire produced in the mind a doubt or fear of the want of ſucceſs, which was the cauſe of the inability of performing the act. As this aroſe entirely from the ſtate of the mind produced by a particular circumſtance, the mind was to be applied to for the cure; and I told him that he might be cured, if he could perfectly rely on his own power of ſelf-denial. When I had explained what I meant, he told me that he could depend upon every act of his will or reſolution. I then told him that, if he had a perfect confidence in himſelf in that reſpect, he was to go to bed to this woman, but firſt promiſe to himſelf that he would not have any connection with her for ſix nights, let his inclinations and powers be what they would; which he engaged to do, and alſo to let me know the reſult. About a fortnight after, he told me, that this reſolution had produced ſuch a total alteration in the ſtate of his mind, that the power ſoon took place; for, inſtead of going to bed with the fear of inability, he went with fears that he ſhould be poſſeſſed with too much deſire, too much power, ſo as to become uneaſy to him; which really happened; for he would have been happy to have ſhortened the time: and, when he had once broke the ſpell, the mind and powers went on together, and his mind never returned to its former ſtate.

Impotency alſo happens from a want of proper correſpondence between the action of the teſticles and penis: for we find that an irregularity in the actions of theſe parts ſometimes happens in men, producing impotence; and ſomething ſimilar probably may be one cauſe of barrenneſs in women. In men the parts ſubſervient

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to generation may be divided into two; the eſſential and the acceſſory. The teſticles are the eſſential; the penis, &c. the acceſſory. As this diviſion ariſes from their uſes or actions in health, which exactly correſpond with one another, a want of exactneſs in the correſpondence or ſuſceptibility of thoſe actions may alſo be divided into two: where the actions are reverſed, the acceſſory taking place without the firſt or eſſential, as in the erections of the penis, where neither the mind nor the teſticles are ſtimulated to action; and the ſecond is where the teſticles perform the action of ſecretion too readily for the penis, which has not a correſponding erection. The firſt is called *priapiſm;* and the ſecond is what ought to be called *ſeminal weakneſs.*—The mind has conſiderable effect on the correſpondence of the actions of theſe two parts: but it would appear in many inſtances, that erections of the penis depend more on the ſtate of the mind than the ſecretion of the ſemen does; for many have the ſecretion, but not the erection; but in ſuch, the want of erection appears to be owing to fears of the mind only.

Priapiſm often ariſes ſpontaneouſly; and often from viſible irritation of the penis, as in the venereal gonorrhœa, eſpecially when violent. The ſenſation of ſuch erections is rather uneaſy than pleaſant; nor is the ſenſation of the glands at the time ſimilar to that ariſing from the erections of deſire, but more like to the ſenſation of the parts immediately after coition. Such as ariſe ſpontaneouſly are of more ſerious conſequence than thoſe from inflammation, as they proceed probably from cauſes not curable in themſelves or by any known methods. The priapiſm ariſing from inflammation of the parts, as in a gonorrhœa, is attended with nearly the ſame ſymptoms; but generally the ſenſation is that of pain, proceeding from the inflammation of the parts. It may be obſerved, that what is ſaid of priapiſm is only applicable to it when a diſeaſe in itſelf, and not when a ſymptom of other diſeaſes, which is frequently the caſe.

Seminal weakneſs, or a ſecretion and emiſſion of the ſemen without erection, is the reverſe of a priapiſm, and is by much the worſt diſeaſe of the two. There is great variety in the degrees of this diſeaſe, there being all the gradations from the exact correſpondence of the actions of all the parts to the teſticles acting alone; in every caſe of the diſeaſe, there is too quick a ſecretion and evacuation of the ſemen. Like to the priapiſm, it does not ariſe from deſires and abilities; although when mild it is attended with both, but not in a due proportion; a very ſlight deſire often producing the full effect. The ſecretion of the ſemen ſhall be ſo quick, that ſimple thought, or even toying, ſhall make it flow.—Dreams have produced this evacuation repeatedly in the ſame night; and even when the dreams have been ſo ſlight, that there has been no conſciouſneſs of them when the ſleep has been broken by the act of emiſſion. I have known caſes where the teſticles have been

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ſo ready to ſecrete, that the leaſt friction on the glans has produced an emiſſion: I have known the ſimple action of walking or riding produce this effect, and that repeatedly in a very ſhort ſpace of time. A young man, about four or five and twenty years of age, not ſo much given to venery as moſt young men, had theſe laſt-mentioned complaints upon him. Three or four times in the night he would emit; and if he walked faſt, or rode on horſeback, the ſame thing would happen. He could ſcarcely have connection with a woman before he emitted, and in the emiſſion there was hardly any ſpaſm. He tried every ſuppoſed ſtrengthening medicine, as alſo the cold bath and ſea-bathing, but with no effect. By taking twenty drops of laudanum on going to bed, he prevented the night-emiſſions; and, by taking the ſame quantity in the morning, he could walk or ride without the before-mentioned inconvenience. I directed this practice to be continued for ſome time, although the diſeaſe did not return, that the parts might be accuſtomed to this healthy ſtate of action; and I have reaſon to believe the gentleman is now well. It was found neceſſary, as the conſtitution became more habituated to the opiate, to increaſe the doſe of it.—The ſpaſms, upon the evacuation of the ſemen in ſuch caſes, are extremely ſlight, and a repetition of them ſoon takes place; the firſt emiſſion not preventing a ſecond; the conſtitution being all the time but little affected. When the teſticles act alone, without the acceſſory parts taking up the neceſſary and natural conſequent action, it is ſtill a more melancholy diſeaſe: for the ſecretion ariſes from no viſible or ſenſible cauſe, and does not give any viſible or ſenſible effect, but runs off ſimilar to involuntary ſtools or urine. It has been obſerved that the ſemen is more fluid than natural in ſome of theſe caſes.

There is great variety in the diſeaſed action of theſe parts; of which the following caſe may be conſidered as an example. A gentleman has had a ſtricture in the urethra for many years, for which he has frequently uſed a bougie, but of late has neglected it. He has had no connection with women for a conſiderable time, being afraid of the conſequences. He has often in his ſleep involuntary emiſſions, which generally awake him at the paroxyſm; but what ſurpriſes him moſt is, that often he has ſuch without any ſemen paſſing forwards through the penis, which makes him think that at thoſe times it goes backwards into the bladder. This is not always the caſe, for at other times the ſemen paſſes forwards. At the time the ſemen ſeems to paſs into the bladder, he has the erection, the dream; and is awaked with the ſame mode of action, the ſame ſenſation, and the ſame pleaſure, as when it paſſes through the urethra, whether dreaming or waking. My opinion is, that the ſame irritation takes place in the bulb of the urethra without the ſemen, that takes place there when the ſemen enters, in conſequence of all the natural preparatory ſteps, whereby the very ſame actions are excited as if it came into

the paſſage; from which one would ſuppoſe, that either the ſemen is not ſecreted, or, if it be, that a retrograde motion takes place in the action of the acceleratores urinæ. But, if the firſt be the caſe, then we may ſuppoſe, that in the natural ſtate the action of thoſe muſcles does not ariſe ſimply from the ſtimulus of the ſemen in the part, but from their action being a termination of a preceding one, making part of a ſeries of actions. Thus they may depend upon the friction, or the imagination of a friction, on the penis: the teſticles not doing their part, and the ſpaſm in ſuch caſes ariſing from the friction and not from the ſecretion. In many of thoſe caſes of irregularity, when the erection is not ſtrong, it ſhall go off without the emiſſion; and at other times an emiſſion ſhall happen almoſt without an erection; but theſe ariſe not from debility, but affections of the mind. In many of the preceding caſes, waſhing the penis, ſcrotum, and perinæum, with cold water, is often of ſervice; and, to render it colder than we find it in ſome ſeaſons of the year, common ſalt may be added to it, and the parts waſhed when the ſalt is almoſt diſſolved.

Of GRIEF.

GRIEF is the moſt deſtructive of all the paſſions. Its effects are permanent, and when it ſinks deep into the mind, it generally proves fatal. Anger and fear, being of a more violent nature, ſeldom laſt long; but grief often changes into a fixed melancholy, which preys upon the ſpirits, and waſtes the conſtitution. This paſſion ought not to be indulged. It may generally be conquered at the beginning; but, when it has gained ſtrength, all attempts to remove it are vain. No perſon can prevent misfortunes in life; but it ſhows true greatneſs of mind to bear them with ſerenity. Many perſons make a merit of indulging grief; and, when misfortunes happen, they obſtinately refuſe all conſolation, till the mind, overwhelmed with melancholy, ſinks under the load. Such conduct is not only deſtructive to health, but inconſiſtent with reaſon, religion, and common ſenſe.

Change of ideas is as neceſſary for health as change of poſture. When the mind dwells long upon one ſubject, eſpecially of a diſagreeable nature, it hurts the whole functions of the body. Hence grief indulged ſpoils the digeſtion and deſtroys the appetite; by which means the ſpirits are depreſſed, the nerves relaxed, the bowels inflated with wind, and the humours, for want of freſh ſupplies of chyle, vitiated. Thus many an excellent conſtitution has been ruined by a family-misfortune, or any thing that occaſions exceſſive grief. It is utterly impoſſible, that any perſon of a dejected mind ſhould enjoy health. Life may indeed be dragged out for a few years: but whoever would live to a good old age muſt be good-humoured

humoured and cheerful. This indeed is not altogether in our own power; yet our temper of mind, as well as our actions, depend greatly upon ourſelves. We can either aſſociate with cheerful or melancholy companions, mingle in the amuſements and offices of life, or ſit ſtill and brood over our calamities, as we chooſe.

Theſe, and many ſuch things, are certainly in our power; and from theſe the mind generally takes its caſt. The variety of ſcenes which preſent themſelves to the ſenſes, were certainly deſigned to prevent our attention from being too long fixed upon any one object. Nature abounds with variety; and the mind, unleſs fixed down by habit, delights in contemplating new objects. This at once points out the method of relieving the mind in diſtreſs. Turn the attention frequently to new objects: examine them for ſome time: when the mind begins to recoil, ſhift the ſcene: by this means a conſtant ſucceſſion of new ideas may be kept up, till the diſagreeable ones entirely diſappear. Thus travelling, the ſtudy of any art or ſcience, reading or writing on ſuch ſubjects as deeply engage the attention, will ſooner expel grief than the moſt ſprightly amuſements.

It has already been obſerved, that the body cannot be healthy unleſs it be exerciſed; neither can the mind. Indolence nouriſhes grief. When the mind has nothing elſe to think of but calamities, no wonder that it dwells there. Few people who purſue buſineſs with attention are hurt by grief. Inſtead therefore of abſtracting ourſelves from the world or buſineſs, when misfortunes happen, we ought to engage in it with more than uſual attention, to diſcharge with double diligence the functions of our ſtation, and to mix with friends of a ſocial and cheerful temper. Innocent amuſements are by no means to be neglected. Theſe, by leading the mind inſenſibly to the contemplation of agreeable objects, help to diſpel the gloom which misfortunes caſt over it. They make time ſeem leſs tedious, and have many other happy effects. Some perſons, when overwhelmed with grief, betake themſelves to drinking. This is making the cure worſe than the diſeaſe. It ſeldom fails to end in the ruin of fortune, character, and conſtitution.

Of LOVE.

LOVE is perhaps the ſtrongeſt of all the paſſions; at leaſt, when it becomes violent, it is leſs ſubject to the controul either of the underſtanding or will than any of the reſt. Fear, anger, and ſeveral other paſſions, are neceſſary for the preſervation of the individual; but love is neceſſary for the continuation of the ſpecies itſelf: it was therefore proper that this paſſion ſhould be deeply rooted in the human breaſt.—Though love be a ſtrong paſſion, it is ſeldom ſo rapid in its progreſs as ſeveral of the others. Few perſons fall deſperately in love all at once. We would therefore adviſe every one, before he tampers with this paſſion, to conſider

ſider well the probability of his being able to obtain the object of his love. When that is not likely, he ſhould avoid every occaſion of increaſing it. He ought immediately to fly the company of the beloved object; to apply his mind attentively to buſineſs or ſtudy; to take every kind of amuſement; and, above all, to endeavour, if poſſible, to find another object which may engage his affections, and which it may be in his power to obtain. There is no paſſion with which people are ſo ready to tamper as love, although none is more dangerous. Some men make love for amuſement, others from mere vanity, or on purpoſe to ſhow their conſequence with the fair. This is perhaps the greateſt piece of cruelty which any one can be guilty of. What we eagerly wiſh for, we eaſily credit. Hence the too-credulous fair are often betrayed into a ſituation which is truly deplorable, before they are able to diſcover that the pretended lover was only in jeſt. But there is no jeſting with this paſſion. When love is got to a certain height, it admits of no other cure but the poſſeſſion of its object, which, in this caſe, ought always, if poſſible, to be obtained. The conduct of parents with regard to the diſpoſal of their children in marriage is often very blameable. An advantageous match is the conſtant aim of parents; while their children often ſuffer a real martyrdom between their inclination and their duty. The firſt thing which parents ought to conſult, in diſpoſing of their children in marriage, is certainly their inclinations. Were due regard always paid to theſe, there would be fewer unhappy couples; and parents would not have ſo often cauſe to repent the ſeverity of their conduct, after a ruined conſtitution, a loſt character, or a diſtracted mind, has ſhown them their miſtake.

With regard to love in its uſual and more appropriate ſignification, it may be defined, "that affection which, being compounded of animal deſire, eſteem, and benevolence, becomes the bond of attachment and union between individuals of the different ſexes; and makes them feel in the ſociety of each other a ſpecies of happineſs which they experience no-where elſe." We call it an *affection* rather than a paſſion, becauſe it involves a deſire of the happineſs of its object: and that its conſtituent parts are thoſe which have been juſt enumerated, we ſhall firſt endeavour to prove, and then proceed to trace its riſe and progreſs from a ſelfiſh appetite to a generous ſentiment.

Animal deſire is the actual energy of the ſenſual appetite; and that it is an eſſential part of the complex affection, which is properly called love, is apparent from this conſideration, that, though a man may have ſentiments of eſteem and benevolence towards women who are both old and ugly, he never ſuppoſes himſelf to be in love with any woman towards whom he feels not the ſenſual appetite to have a ſtronger tendency than to other individuals of her ſex. On the other hand, that

animal deſire alone cannot be called the affection of love is evident; becauſe he who gratifies ſuch a deſire without eſteeming its object, and wiſhing to communicate at the ſame time that he receives enjoyment, loves not the woman, but himſelf. Mere animal deſire has nothing in view but the ſpecies and the ſex of its object; and, before it make a ſelection, it muſt be combined with ſentiments very different from itſelf. The firſt ſentiment with which it is combined, and by which a man is induced to prefer one woman to another, ſeems to be that by which we are delighted with gracefulneſs of perſon, regularity of features, and beauty of complexion. It is not indeed to be denied that there is ſomething irreſiſtible in female beauty. The moſt ſevere will not pretend that they do not feel an immediate prepoſſeſſion in favour of a handſome woman; but this prepoſſeſſion, even when combined with animal deſire, does not conſtitute the whole of that affection which is called love. Savages feel the influence of the ſenſual appetite, and it is extremely probable that they have ſome ideas of beauty; but among ſavages the affection of love is ſeldom felt. Even among the lower orders in civil ſociety it ſeems to be a very groſs paſſion, and to have in it more of the ſelfiſhneſs of appetite than of the generoſity of eſteem. To theſe obſervations many exceptions will no doubt be found; but we ſpeak of ſavages in general, and of the great body of the labouring poor, who in the choice of their mates do not ſtudy—who indeed are incapable of ſtudying—that rectitude of mind and thoſe delicacies of ſentiment, without which neither man nor woman can deſerve to be eſteemed.

In the ſavage ſtate, and even in the firſt ſtages of refinement, the bond of union between the ſexes ſeems to conſiſt of nothing more than mere animal deſire and inſtinctive tenderneſs for their infant progeny. The former impels them to unite for the propagation of the ſpecies; and the latter preſerves the union till the children, who are the fruit of it, are able to provide for their own ſubſiſtence. That in ſuch unions, whether caſual or permanent, there is no mutual eſteem and benevolence, is apparent from the ſtate of ſubjection in which women are held in rude and uncultivated nations, as well as from the manner in which marriages are in ſuch nations contracted.

Sweetneſs of temper, a capital article with us in the female character, diſplays itſelf externally in mild looks and gentle manners, and is the firſt and perhaps the moſt powerful inducement to love in a cultivated mind. But ſuch graces are ſcarcely diſcernible in a female ſavage; and even in the moſt poliſhed woman would not be perceived by a male ſavage. Among ſavages, ſtrength and boldneſs are the only valuable qualities. In theſe females are commonly deficient; for which reaſon they are contemned by the males as beings of an inferior order. The North-American tribes glory in idleneſs; the drudgery of labour degrades a man in their

opinion, and is proper for woman only. To join young perſons in marriage is accordingly the buſineſs of the parents; and it would be unpardonable meanneſs in the bridegroom to ſhow any fondneſs for the bride. In Guiana a woman never eats with her husband, but after every meal attends him with water for waſhing; and in the Caribbee iſlands ſhe is not permitted to eat even in the preſence of her huſband. Dampier obſerves in general, that among all the wild nations with which he was acquainted the women carry the burdens, while the men walk before, and carry nothing but their arms; and that women even of the higheſt rank are not better treated. In Siberia, and even in Ruſſia, the capital excepted, men till very lately treated their wives in every reſpect like ſlaves. It might indeed be thought, that animal deſire, were there nothing elſe, ſhould have raiſed women to ſome degree of eſtimation among men; but male ſavages, utter ſtrangers to decency and refinement, gratify animal deſire with as little ceremony as they do hunger or thirſt.

Hence it was that in the early ages of ſociety a man purchaſed a woman to be his wife as one purchaſes an ox or a ſheep to be food; and valued her only as ſhe contributed to his ſenſual gratification. Inſtances innumerable might be collected from every nation of which we are acquainted with the early hiſtory; but we ſhall content ourſelves with mentioning a few. Abraham bought Rebekah, and gave her to his ſon Iſaac for a wife. Jacob, having nothing to give, ſerved Laban fourteen years for two wives. To David, demanding Saul's daughter in marriage, it was ſaid, "The king deſireth not any dowry, but an hundred foreſkins of the Philiſtines." In the Iliad, Agamemnon offers his daughter to Achilles for a wife; and ſays that he would not demand for her any price. By the laws of Ethelbert, king of England, a man who committed adultery with his neighbour's wife was obliged to pay the huſband a fine, and to buy him another wife. But it is needleſs to multiply inſtances; the practice has prevailed univerſally among nations emerging from the ſavage ſtate, or in the rudeſt ſtage of ſociety; and, wherever it prevailed, men could not poſſibly have for the ſex any of that tender regard and eſteem which conſtitute ſo eſſential a part of the complex affection of love.

But, if among ſavages and the vulgar love be unknown, it cannot poſſibly be an inſtinctive affection; and therefore it may be aſked, How it gets poſſeſſion of the human heart; and by what means we can judge whether in any particular inſtance it be real or imaginary? Theſe queſtions are of importance, and deſerve to be fully anſwered; though many circumſtances conſpire to render it no eaſy taſk to give to them ſuch anſwers as ſhall be perfectly ſatisfactory. Love can ſubſiſt only between individuals of the different ſexes. A man can hardly love two women at the ſame time; and we believe that a woman is ſtill leſs capable of loving

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at once more than one man. Love, therefore, has a natural tendency to make men and women pair; or, in other words, it is the ſource of marriage: but in poliſhed ſociety, where alone this affection has any place, ſo many things beſides mutual attachment are neceſſary to make the married life comfortable, that we rarely ſee young perſons uniting from the impulſe of love, and have therefore but few opportunities of tracing the riſe, progreſs, and conſequences, of the affection. We ſhall, however, throw together ſuch reflections as have occurred to us on the ſubject, not without indulging a hope, that they may be uſeful to the younger part of our readers when forming the moſt important connection in life.

We have ſaid, that the perfection of beauty, combined with animal deſire, is the firſt inducement which a man can have to prefer one woman to another. It may be added, that elegance of figure, a placid maſculine countenance, with a perſon which indicates ſtrength and agility, are the qualities which firſt tend to attach any woman to a particular man. Beauty is defined, "That particular form which is the moſt common of all particular forms to be met with in the ſame ſpecies of beings." Let us apply this definition to our own ſpecies, and try, by means of it, to aſcertain what conſtitutes the beauty of the human face. It is evident, that of countenances we find a number almoſt infinite of different forms, of which forms one only conſtitutes beauty, whilſt the reſt, however numerous, conſtitute what is not beauty, but deformity or uglineſs. To an attentive obſerver, however, it is evident, that of the numerous particular forms of uglineſs, there is not one which includes ſo many faces as are formed after that particular caſt which conſtitutes beauty. Every particular ſpecies of the animal as well as of the vegetable creation may be ſaid to have a fixed or determinate form, to which, as to a centre, nature is continually inclining. Or it may be compared to pendulums vibrating in different directions over one central point; and, as they all croſs the centre, though only one paſſes through any other point, ſo it will be found that perfect beauty is oftener produced by nature than deformity: we do not mean than deformity in general, but than any one kind and degree of deformity. To inſtance in a particular part of a human feature: the line which forms the ridge of the noſe is deemed beautiful when it is ſtraight; but this is likewiſe the central form, which is oftener found than any one particular degree of concave, convex, or any other irregular form that ſhall be propoſed. As we are then more accuſtomed to beauty than deformity, we may conclude that to be the reaſon why we approve and admire it, juſt as we approve and admire faſhions of dreſs for no other reaſon than that we are uſed to them. The ſame thing may be ſaid of colour as of form: it is cuſtom alone which determines our preference of the colour of the Europeans to that of the Ethiopians, and which makes them prefer their own colour

colour to ours; ſo that, though habit and cuſtom cannot be the cauſe of beauty, they are certainly the cauſe of our liking it. That we do like it cannot be denied. Every one is conſcious of a pleaſing emotion when contemplating beauty either in man or woman; and, when that pleaſure is combined with the gratification of the ſenſual appetite, it is obvious that the ſum of enjoyment muſt be greatly increaſed. The perception of beauty, therefore, neceſſarily directs the energy of the ſenſual appetite to a particular object; but ſtill this combination is a mere ſelfiſh feeling, which regards its object only as the beſt of many ſimilar inſtruments of pleaſure. Before it can deſerve the name of love, it muſt be combined with eſteem, which is never beſtowed but upon moral character and internal worth; for, let a woman be ever ſo beautiful, and of courſe ever ſo deſirable as an inſtrument of ſenſual gratification, if ſhe be not poſſeſſed of the virtues and diſpoſitions which are peculiar to her ſex, ſhe will inſpire no man with a generous affection. With regard to the outlines, indeed, whether of internal diſpoſition or of external form, men and women are the ſame; but nature, intending them for mates, has given them diſpoſitions, which, though concordant, are however different, ſo as to produce together delicious harmony. The man, more robuſt, is fitted for ſevere labour, and for field-exerciſes; the woman, more delicate, is fitted for ſedentary occupations, and particularly for nurſing children. The man, bold and vigorous, is qualified for being a protector; the woman, delicate and timid, requires protection. Hence it is, that a man never admires a woman for poſſeſſing bodily ſtrength or perſonal courage; and women always deſpiſe men who are deſtitute of them. The man, as a protector, is directed by nature to govern; the woman, conſcious of inferiority, is diſpoſed to obey. Their intellectual powers correſpond to the deſtination of nature. Men have penetration and ſolid judgment to fit them for governing; women have underſtanding to make an engaging figure under good government: a greater proportion would excite dangerous rivalſhip between the ſexes, which nature has avoided by giving them different talents. Women have more imagination and ſenſibility than men, which make all their enjoyments more exquiſite; at the ſame time that they are better qualified to communicate enjoyment. Add another capital difference of diſpoſition: the gentle and inſinuating manners of the female ſex tend to ſoften the roughneſs of the other ſex; and, wherever women are indulged with any freedom, they poliſh ſooner than men.

Theſe are not the only particulars that diſtinguiſh the ſexes. With reſpect to the ultimate end of love, it is the privilege of the male, as ſuperior and protector, to make a choice: the female, preferred, has no privilege but barely to conſent or to refuſe. Whether this diſtinction be the immediate reſult of the originally-different diſpoſitions of the ſexes, or only the effect of aſſociations inevitably form-

ed, may be queſtioned; but among all nations it is the practice for men to court, and for women to be courted: and, were the moſt beautiful woman on earth to invert this practice, ſhe would forfeit the eſteem, however by her external grace ſhe might excite the deſire, of the man whom ſhe addreſſed. The great moral virtues, which may be comprehended under the general term *integrity*, are all abſolutely neceſſary to make either men or women eſtimable; but, to procure eſteem to the female character, the *modeſty* peculiar to their ſex is a very eſſential circumſtance. Nature hath provided them with it as a defence againſt the artful ſolicitations of the other ſex before marriage, and alſo as a ſupport of conjugal fidelity.

A woman, therefore, whoſe diſpoſitions are gentle, delicate, and rather timid than bold, who is poſſeſſed of a large ſhare of ſenſibility and modeſty, and whoſe manners are ſoft and inſinuating, muſt, upon moral principles, command the eſteem and benevolence of every individual of the other ſex who is poſſeſſed of ſound underſtanding; but, if her perſon be deformed, or not ſuch as to excite ſome degree of animal deſire, ſhe will attract no man's love. In like manner, a man whoſe moral character is good, whoſe underſtanding is acute, and whoſe converſation is inſtructive, muſt command the eſteem of every ſenſible and virtuous woman; but, if his figure be diſagreeable, his manners unpoliſhed, his habits ſlovenly, and, above all, if he be deficient in PERSONAL COURAGE, he will hardly excite deſire in the female breaſt. It is only when the qualities which command eſteem are, in the ſame perſon, united with thoſe which excite deſire, that the individual ſo accompliſhed can be an object of love to one of the other ſex; but, when theſe qualities are thus united, each of them increaſes the other in the imagination of the lover. The beauty of his miſtreſs gives her, in his apprehenſion, a greater ſhare of gentleneſs, modeſty, and every thing which adorns the female character, than perhaps ſhe really poſſeſſes; whilſt this perſuaſion of her internal worth makes him, on the other hand, apprehend her beauty to be abſolutely unrivalled.

The affection thus generated is more or leſs pure, and will be more or leſs permanent, according as the one or the other part of which it is compounded predominates. Where deſire of poſſeſſion prevails over our eſteem of the perſon and merits of the deſirable object, love loſes its benevolent character; the appetite for gratification becomes ungovernable, and tends violently to its end, regardleſs of the miſery that muſt follow. In that ſtate, love is no longer a ſweet agreeable affection; it becomes a ſelfiſh, painful, paſſion, which, like hunger and thirſt, produces no happineſs but in the inſtant of fruition; and, when fruition is over, diſguſt and averſion generally ſucceed to deſire. On the other hand, where eſteem, founded on a virtuous character and gentle manners, prevails over animal deſire,

the lover would not for the world gratify his appetite at the expenſe of a lady's honour or peace of mind. He wiſhes, indeed, for enjoyment; and to him enjoyment is more exquiſite than to the mere ſenſual lover, becauſe it unites ſentiment with the gratification of ſenſe; at the ſame time that, ſo far from being ſucceeded by diſguſt or averſion, it increaſes his benevolence to the woman, whoſe character and manners he eſteems, and who has contributed ſo much to his pleaſure. Benevolence to an individual, having a general end, admits of acts without number, and is ſeldom fully accompliſhed. Hence mutual love, which is compoſed chiefly of eſteem and benevolence, can hardly be of a ſhorter duration than its objects. Frequent enjoyment endears ſuch lovers to each other, and makes conſtancy a pleaſure; and, when the days of ſenſual enjoyment are over, eſteem and benevolence will remain in the mind, making ſweet, even in old age, the ſociety of that pair, in whom are collected the affections of huſband, wife, lover, friend—the tendereſt affections of human nature.

From the whole of this inveſtigation, we think it appears, that the affection between the ſexes which deſerves the name of love, is inſeparably connected with virtue and delicacy: that a man of gallantry cannot be a faithful or a generous lover; that in the breaſt of him, who has ranged from woman to woman for the mere gratification of his ſenſual appetite, deſire muſt have effaced all eſteem for the female character; and that, therefore, the maxim too generally received, "that a reformed rake makes the beſt huſband," has very ſeldom a chance to be true. We think it may likewiſe be inferred, that thouſands fancy themſelves in love who know not what love is, or how it is generated in the human breaſt; and therefore we beg leave to adviſe ſuch of our readers as may imagine themſelves to be in that ſtate, to examine their own minds, with a view to diſcover, whether, if the object of their love were old and ugly, they would ſtill eſteem them for the virtues of their character, and the propriety of their manners. This is a queſtion which deſerves to be well weighed by the young and amorous, who, in forming the matrimonial connection, are too often blindly impelled by mere animal deſire, inflamed by beauty. It may indeed happen, after the pleaſure of gratifying that deſire is gone, (and if not refined by eſteem and benevolence, go it muſt with a ſwift pace,) that a new bond of attachment may be formed upon more dignified and more laſting principles; but this is a dangerous experiment. Even ſuppoſing good ſenſe, good temper, and internal worth of every ſort, yet a new attachment, even upon ſuch qualifications, is rarely formed; becauſe it commonly, or rather always, happens, that ſuch qualifications, the only ſolid foundation of an indiſſoluble connection, if they did not originally make eſteem predominate over animal deſire, are afterwards rendered altogether inviſible by ſatiety of enjoyment creating diſguſt,

which is generally the caſe with violent love founded on the deſire of enjoyment only. As the delicate nature of female honour and decorum, and the inexpreſſible grace of a chaſte and modeſt behaviour, are the ſureſt and indeed the only means of kindling at firſt, and ever after of keeping alive, this tender and elegant flame, and of accompliſhing the excellent ends deſigned by it; to attempt by fraud to violate the one, or under pretence of paſſion to ſully and corrupt the other, and, by ſo doing, to expoſe the too-often credulous and unguarded object, with a wanton cruelty, to the hatred of her own ſex and the ſcorn of ours, and to the loweſt infamy of both,—is a conduct not only baſe and criminal, but inconſiſtent with that truly rational and refined enjoyment, the ſpirit and quinteſſence of which is derived from the baſhful and ſacred charms of virtue kept untainted, and therefore ever alluring to the lover's heart.

The ſymptoms produced by love as a diſeaſe are as follow: The eye-lids often twinkle; the eyes are hollow, and yet appear as if full with pleaſure; the pulſe is not peculiar to the paſſion, but the ſame with that which attends ſolicitude and care. When the object of this affection is thought of, particularly if the idea is ſudden, the ſpirits are confuſed, the pulſe changes, and its force and time are very variable: in ſome inſtances, the perſon is ſad and watchful; in others, not being conſcious of his ſtate, he pines away, is ſlothful, and regardleſs of food. As the paſſion prevails, ſighs grow deeper; a tremor affects the heart and pulſe; the countenance is alternately pale and red; the voice is ſuppreſſed; the eyes grow dim: cold ſweats break out; ſleep abſents itſelf; the ſecretions become diſturbed, and a loſs of appetite, a hectic fever, melancholy, or perhaps madneſs, or death, conſtitutes the ſad cataſtrophe. On this ſubject the curious may conſult Ægineta, lib. iii. cap. 7. Oribat. Synop. lib. viii. cap. 9. or a treatiſe profeſſedly written on Love, as it is a diſtemper, by James Ferrard, Oxford, 1640.

The ancients were much addicted to amulets and potions to excite love in the object of their deſire, the operation of which was violent and dangerous, and frequently deprived ſuch as drank them of their reaſon. Some of the moſt remarkable ingredients of which they were compoſed were theſe: the hippomanes, the jynx, inſects bred from putrefaction, the fiſh remora, the lizard, brains of a calf, the hairs on the tip of a wolf's tail, his ſecret parts, the bones of the left ſide of a toad eaten with ants, the blood of doves, bones of ſnakes, feathers of ſcreech-owls, twiſted cords of wool in which a perſon had hanged himſelf, rags, torches, reliques, a neſt of ſwallows buried and famiſhed in the earth, bones ſnatched from hungry bitches, the marrow of a boy famiſhed in the midſt of plenty, dried human liver; to theſe may be added ſeveral herbs growing out of putrid ſubſtances. Such were the ingredients that entered into the compoſition of that infernal draught a love-potion.

potion. The antidotes againſt love were generally *agnus caſtus*, which has the power of weakening the generative faculty; ſprinkling the duſt in which a mule has rolled herſelf; tying toads in the hide of a beaſt newly ſlain; applying amulets of minerals or herbs, which were ſuppoſed of great efficacy.

Of MELANCHOLY.

THE pathology of melancholy and mania is very obſcure; as coming on without any fever, or diſturbance in the blood's motion. Often alſo they are hereditary, depending on the original ſtructure of the body, eſpecially of the brain; the fault of which, however, cannot be detected by the niceſt anatomiſt. But it is well known, that various diſeaſes of the brain, obſtructions, tumors, either of the brain itſelf or of the cranium preſſing upon it, any injury done to the head, and, as ſome phyſicians relate, the hardneſs and dryneſs of the brain, and ſome peculiar irritations affecting the nervous ſyſtem, are capable of bringing on this malady. And indeed ſo great are the irritations affecting the nervous ſyſtem in mad people, that they often ſleep little or none for a long time. Yet even this ſo defective and imperfect knowledge of the diſeaſes of the brain and nerves, is by no means free from difficulties. For, though we know that the brain, or a certain part of it, is hurt, or that it is irritated, by a ſwelling, or a pointed bone growing into it, nobody can foretel how great, or what, may be the nature of the malady from ſuch a hurt: for examples are not wanting of people who, after loſing a large part of the brain, have recovered and lived a long time; or of thoſe who have perceived no inconvenience from a large portion of that viſcus being corrupted, until at length they have fallen ſuddenly down and died in convulſions.

Many perſons of a religious turn of mind behave as if they thought it a crime to be cheerful. They imagine the whole of religion conſiſts in certain mortifications, or denying themſelves the ſmalleſt indulgence, even of the moſt innocent amuſements. A perpetual gloom hangs upon their countenances, while the deepeſt melancholy preys upon their minds. At length the faireſt proſpects vaniſh, every thing puts on a diſmal appearance, and thoſe very objects which ought to give delight afford nothing but diſguſt. Life itſelf becomes a burden, and the unhappy wretch, perſuaded that no evil can equal what he feels, often puts an end to his own miſerable exiſtence. It is great pity that ever religion ſhould be ſo far perverted as to become the cauſe of thoſe very evils which it was deſigned to prevent. Nothing can be better calculated than true religion to raiſe and ſupport the mind of its votaries under every affliction that can befal them. It teaches them that even the ſufferings of this life are preparatory to the happineſs

of

of the next; and that all who perſiſt in a courſe of virtue ſhall at length arrive at complete felicity.

Perſons whoſe buſineſs it is to recommend religion to others, ſhould beware of dwelling too much on gloomy ſubjects. That peace and tranquillity of mind, which true religion is calculated to inſpire, is a more powerful argument in its favour, than all the terrors that can be uttered. Terror may indeed deter men from outward acts of wickedneſs; but can never inſpire them with that love of God, and real goodneſs of heart, in which alone true religion conſiſts. In ſhort, the beſt way to counteract the violence of any paſſion, is to keep the mind cloſely engaged in ſome uſeful purſuit.

Of the PROGNOSTICS of DISEASES; with RULES for PRESERVING HEALTH.

PROGNOSTIC is a judgment of the event either of a ſtate of health, or of a diſeaſe; as, Whether it ſhall end in life or death, be long or ſhort, mild or malignant, &c. taken from certain ſymptoms thereof. When, by the following remarks, the perſon ſhall judge what diſorder is coming upon him, or already preſent, a ſafe and effectual remedy will in general be found in the Medical Part of the Herbal; but, whenever that work is not ſufficiently full to the purpoſe, I ſhall add ſuch occaſional obſervations for prevention and cure as have occurred to me in my late practice.

Hippocrates was the firſt who treated of medicine in a regular and rational manner, and he is therefore juſtly conſidered as the father of phyſic. Hippocrates remarked four ſtages in diſtempers; viz. The beginning of the diſeaſe, its augmentation, its ſtate or height, and its declination. In ſuch diſeaſes as terminate fatally, death comes in place of declination. In the third ſtage, therefore, the change is moſt conſiderable, as it determines the fate of the ſick perſon; and this is moſt commonly done by means of a *criſis*. By this word he underſtood any ſudden change in ſickneſs, whether for the better or for the worſe, whether health or death ſucceed immediately. Such a change, he ſays, is made at that time by nature either abſolving or condemning the patient. Hence we may conclude, that Hippocrates imagined diſeaſes to be only a diſturbance of the animal economy, with which Nature was perpetually at variance, and uſing her utmoſt endeavours to expel the offending cauſe. Her manner of acting on theſe occaſions is to reduce to their natural ſtate thoſe humours whoſe diſcord occaſions the diſturbance of the whole body, whether in relation to their quantity, quality, mixture, motion, or any other way in which they become offenſive. The principal means employed by nature for this

end is what Hippocrates calls *concoction.* By this he underſtood the bringing the morbific matter lodged in the humours to ſuch a ſtate, as to be eaſily fitted for expulſion by whatever means nature might think moſt proper. When matters are brought to this paſs, whatever is ſuperfluous or hurtful immediately empties itſelf, or nature points out to phyſicians the way by which ſuch an evacuation is to be accompliſhed. The criſis takes place either by bleeding, ſtool, vomit, ſweat, urine, tumors or abſceſſes, ſcabs, pimples, ſpots, &c. But theſe evacuations are not to be looked upon as the effects of a true criſis, unleſs in conſiderable quantity; ſmall diſcharges not being ſufficient to make a criſis; which, on the contrary, are a ſign that nature is depreſſed by the load of humours, and that ſhe lets them go through weakneſs and continual irritation. What comes forth in this manner is crude, becauſe the diſtemper is yet too ſtrong; and, while matters remain in this ſtate, only a bad or imperfect criſis is to be expected. This ſhows that the diſtemper triumphs, or at leaſt is equal in ſtrength to nature, which prognoſticates death, or a prolongation of the diſeaſe. In this laſt caſe, however, nature often has an opportunity of attempting a new criſis more happy than the former, after having made freſh efforts to advance the concoction of the humours.—It muſt here be obſerved however, that, according to Hippocrates, concoction cannot be made but in a certain time, as every fruit has a limited time to ripen; for he compares the humours which nature has digeſted to fruits come to maturity. The time required for concoction depends on the differences among diſtempers mentioned above. In thoſe which Hippocrates calls very acute, the digeſtion or criſis happens by the fourth day; in thoſe which are only acute, it happens on the ſeventh, eleventh, or fourteenth, day; which laſt is the longeſt period generally allowed by Hippocrates in diſtempers that are truly acute, though in ſome places he ſtretches it to the twentieth or twenty-firſt, nay, ſometimes to the fortieth or ſixtieth, days. All diſeaſes that exceed this laſt term are called *chronical.* And while, in thoſe diſeaſes that exceed fourteen days, he conſiders every fourth day as critical, or at leaſt remarkable, by which we may judge whether the criſis on the fourth day will be favourable or not; ſo in thoſe which run from twenty to forty he reckons only the ſevenths, and in thoſe that exceed forty he begins to reckon by twenty. Beyond the hundred and twentieth he thinks that the number of days has no power over the criſis. They are then referred to the general changes of the ſeaſon; ſome terminating about the equinoxes; others about the ſolſtices; others about the riſing or ſetting of the ſtars of certain conſtellations; or, if numbers have yet any place, he reckons by months, or even whole years. Thus (he ſays) certain diſeaſes in children have their criſes in the ſeventh month after their birth, and others in their ſeventh or even their fourteenth year.

Though

Though Hippocrates mentions the twenty-firſt as one of the critical days in acute diſtempers, as already noticed; yet, in other places of his works, he mentions alſo the twentieth. The reaſon he gives for this in one of thoſe places of his works is, that the days of ſickneſs were not quite entire. In general, however, he is much attached to the odd days: inſomuch that in one of his aphoriſms he tells us, "The ſweats that come out upon the third, fifth, ſeventh, ninth, eleventh, fourteenth, ſeventeenth, twenty-firſt, twenty-ſeventh, thirty-firſt, or thirty-fourth, days, are beneficial; but thoſe that come out upon other days ſignify that the ſick ſhall be brought low, that his diſeaſe ſhall be very tedious, and that he ſhall be ſubject to relapſes." He farther ſays, that "the fever which leaves the ſick upon any but an odd day is uſually apt to relapſe." Sometimes, however, he confeſſes that it is otherwiſe; and he gives an inſtance of a ſalutary criſis happening on the ſixth day. But theſe are very rare inſtances, and therefore cannot, in his opinion, overthrow the general rule. Beſides the criſis, however, or the change which determines the fate of the patient, Hippocrates often ſpeaks of another, which only changes the ſpecies of the diſtemper, without reſtoring the patient to health; as when a vertigo is turned to an epilepſy, a tertian fever to a quartan, or to a continual, &c.

But what chiefly contributed to procure the vaſt reſpect generally paid to Hippocrates, was his accuracy in prognoſtics: thus he not only diſtinguiſhed one diſeaſe from another by the ſigns which properly belonged to each; but by comparing the ſame ſort of diſtemper which happened to ſeveral perſons, and the accidents which uſually appeared before and after, he could often foretel a diſeaſe before it came, and afterwards give a right judgment of the event of it. By this way of prognoſticating, he came to be exceedingly admired; and this he carried to ſuch a height, that it may juſtly be ſaid to be his maſter-piece; and Celſus, who lived after him, remarks that ſucceeding phyſicians, though they found out ſeveral new things relating to the management of diſeaſes, yet were obliged to the writings of Hippocrates for all that they knew of ſigns; and let us add, that we are obliged to Celſus for a true underſtanding of the works of Hippocrates. The firſt thing Hippocrates conſidered, when called to a patient, was his looks.—It was a good ſign with him to have a viſage reſembling that of a perſon in health, and the ſame with what the ſick man had before he was attacked by the diſeaſe. As it varied from this, ſo much the greater danger was apprehended. The following is the deſcription which he gives of the looks of a dying man:—"When a patient (ſays he) has his noſe ſharp, his eyes ſunk, his temples hollow, his ears cold and contracted, the ſkin of his forehead tenſe and dry, and the colour of his face tending to a pale-green or lead-colour, one may give out for certain that death is very near at hand; unleſs the ſtrength of the patient has been exhauſted all at once by long watchings, or by a looſeneſs,

looſeneſs, or being a long time without eating." This obſervation has been confirmed by thoſe of ſucceeding phyſicians, who have, from him, denominated it the *Hippocratic face.* The lips hanging relaxed and cold, are likewiſe looked upon by this author as a confirmation of the foregoing prognoſtic. He took alſo his ſigns from the diſpoſition of the eyes in particular. When a patient cannot bear the light; when he ſheds tears involuntarily; when, in ſleeping, ſome part of the white of the eye is ſeen, unleſs he uſually ſleeps after that manner, or has a looſeneſs upon him: theſe ſigns, as well as the foregoing ones, prognoſticate danger. The eyes deadened, with a miſt before them, or their brightneſs loſt, preſages death, or great weakneſs. Eyes ſparkling, fierce, and fixed, denote the patient to be delirious, or that he ſoon will be ſeized with a frenzy. When the patient ſees any thing red, and like ſparks of fire and lightning paſs before his eyes, you may expect an hæmorrage; and this often happens before thoſe criſes which are to be attended by a loſs of blood. The condition of the patient is alſo ſhown by his poſture in bed. If you find him lying on one ſide, his body, neck, legs, and arms, a little contracted, which is the poſture of a man in health, it is a good ſign: on the contrary, if he lies on his back, his arms ſtretched out, and his legs hanging down, it is a ſign of great weakneſs; and particularly when the patient ſlides or lets himſelf fall down towards the feet, it denotes the approach of death. When a patient in a burning fever is continually feeling about with his hands and fingers, and moves them up before his face and eyes as if to take away ſomething that paſſed before them; or on his bed-covering, as if picking or ſearching for little ſtraws, or taking away ſome filth, or drawing out little flocks of wool; all this is a ſign that he is delirious, and that he will die. Amongſt the other ſigns of a preſent or approaching delirium, he alſo adds this: When a patient who naturally ſpeaks little begins to talk more than he uſed to do, or when one that talks much becomes ſilent, this change is to be reckoned a ſort of delirium, or is a ſign that the patient will ſoon fall into one. The frequent trembling or ſtarting of the tendons of the wriſts preſages likewiſe a delirium. As to the different ſorts of delirium, Hippocrates is much more afraid of thoſe that run upon mournful ſubjects than ſuch as are accompanied with mirth.

When a patient breathes faſt, and is oppreſſed, it is a ſign that he is in pain, and that the parts above the diaphragm are inflamed. Breathing long, or when the patient is a great while in taking his breath, ſhows him to be delirious; but eaſy and natural reſpiration is always a good ſign in acute diſeaſes. Hippocrates depended much on the reſpiration in making his prognoſtics; and therefore has taken care in ſeveral places to deſcribe the different manner of a patient's breathing. Continual watching in acute diſeaſes, are ſigns of preſent pain, or a delirium near at hand. Hippocrates alſo drew ſigns from all excrements, whatever they are, that are ſepa-

rated from the body of man. His moſt remarkable prognoſtics, however, were from the urine. The patient's urine, in his opinion, is beſt when the ſediment is white, ſoft to the touch, and of equal conſiſtence. If it continue ſo during the courſe of the diſtemper, and till the time of the criſis, the patient is in no danger, and will ſoon be well. This is what Hippocrates called *concocted urine*, or what denotes the concoction of the humours; and he obſerved, that this concoction of the urine ſeldom appeared thoroughly but on the days of the criſis which happily put an end to the diſtemper. "We ought (ſaid Hippocrates) to compare the urine with the purulent matter which runs from ulcers. As the pus, which is white, and of the ſame quality with the ſediment of the urine we are now ſpeaking of, is a ſign that the ulcer is on the point of cloſing, ſo that which is clear, and of another colour than white, and of an ill ſmell, is a ſign that the ulcer is virulent, and therefore very difficult to be cured: the urines that are like this we have deſcribed are only thoſe which may be named good; all the reſt are ill, and differ from one another only in the degrees of more and leſs. The firſt never appear but when nature has overcome the diſeaſe; and are a ſign of the concoction of humours, without which you cannot hope for a certain cure. On the contrary, the laſt are made as long as the crudity remains, and the humours continue unconcocted. Among the urines of this laſt ſort, the beſt are reddiſh, with a ſediment that is ſoft, and of an equal conſiſtence; which denotes, that the diſeaſe will be ſomewhat tedious, but without danger. The worſt are thoſe which are very red, and at the ſame time clear and without ſediment; or that are muddy and troubled in the making. In urine there is often a ſort of cloud hanging in the veſſel in which it is received; the higher this riſes, or the farther diſtant it is from the bottom, or the more different from the colour of the laudable ſediment above-mentioned, the more there is of crudity. That which is yellow, or of a ſandy colour, denotes abundance of bile; that which is black is the worſt, eſpecially if it has an ill ſmell, and is either altogether muddy or altogether clear. That whoſe ſediment is like large ground wheat, or little flakes or ſcales ſpread one upon another, or bran, preſages ill, eſpecially the laſt. The fat or oil that ſometimes ſwims upon the top of the urine, and appears in a form ſomething like a ſpider's web, is a ſign of a conſumption of the fleſh and ſolid parts. The making of a great quantity of urine is the ſign of a criſis, and ſometimes the quality of it ſhows how the bladder is affected. We muſt alſo obſerve, that Hippocrates compared the ſtate of the tongue with the urine; that is to ſay, when the tongue was yellow, and charged with bile, the urine he knew muſt of courſe be of the ſame colour; and, when the tongue was red and moiſt, the urine was of its natural colour. His prognoſtics from the excretions by ſtool are as follow: Thoſe that are ſoft, yellowiſh, of ſome conſiſtence, and not of an extraordinary ill

ſmell, that anſwer to the quantity of what is taken inwardly, and that are voided at the uſual hours, are the beſt of all. They ought alſo to be of a thicker conſiſtence when the diſtemper is near the criſis; and it ought to be taken for a good prognoſtic, when ſome worms, round and long, are evacuated at the ſame time with them. The prognoſis, however, may ſtill be favourable, though the matter excreted be thin and liquid, provided the evacuation be not in a very large quantity and too often, ſo as to make the patient faint. All matter that is watery, white, of a pale green or red, or frothy and viſcous, is bad. That which is blackiſh, or of a livid hue, is the moſt pernicious. That which is pure black, and nothing elſe but a diſcharge of black bile, always prognoſticates very ill; this humour, from what part ſoever it comes, ſhowing the ill diſpoſition of the inteſtines. The matter that is of ſeveral different colours denotes the length of the diſtemper, and, at the ſame time, that it may be of dangerous conſequence. Hippocrates places in the ſame claſs the matter that is bilious or yellow, mixed with blood, or green and black, or like the dregs or ſcrapings of the guts. The ſtools that conſiſt of pure bile, or entirely phlegm, he alſo looks upon to be very bad. Matter caſt up by vomiting ought to be mixed with bile and phlegm; where one of theſe humours only is obſerved, it is worſe. That which is black, livid, green, or the colour of a leek, indicates alarming conſequences. The ſame is to be ſaid of that which ſmells very ill; and, if at the ſame time it be livid, death is not far off. The vomiting of blood is very often mortal. The ſpittings which give eaſe in diſeaſes of the lungs and in pleuriſies, are thoſe that come up readily and without difficulty: and it is good if they be mixed at the beginning with much yellow: but if they appear of the ſame colour, or are red, a great while after the beginning of the diſtemper, are ſalt and acrimonious, and cauſe violent coughings, they are not good. Spittings purely yellow are bad; and thoſe that are white, viſcous, and frothy, give no eaſe. Whiteneſs is a good ſign of concoction in regard to ſpittings; but they ought not all to be viſcous, nor too thick, nor too clear. We may make the ſame judgment of the excrements of the noſe according to their concoction and crudity. Spittings that are black, green, and red, are of bad conſequence. In inflammations of the lungs, thoſe that are mixed with bile and blood preſage well if they appear at the beginning, but are bad if they ariſe not about the ſeventh day. But the worſt ſign in theſe diſtempers is, when there is no expectoration at all, and the too great quantity of matter that is ready to be diſcharged this way makes a rattling in the breaſt. After ſpitting of blood, the diſcharge of purulent matter often follows, which brings on a conſumption, and at laſt death. A kind good ſweat is that which ariſes on the day of the criſis, and is diſcharged in abundance all over the body, and at the ſame time from all parts of the body, and thus carries off the fever.

ver. A cold ſweat is alarming, eſpecially in acute fevers, for in others it is only a ſign of long continuance. When the patient ſweats no-where but on the head and neck, it is a ſign that the diſeaſe will be long and dangerous. A gentle ſweat in ſome particular part, of the head and breaſt for inſtance, gives no relief, but denotes the ſeat of the diſtemper, or the weakneſs of the part. This kind of ſweat was called by Hippocrates *ephidroſis*. The hypochondria, or the abdomen in general, ought always to be ſoft and even, as well on the right ſide as on the left. When there is any hardneſs or unevenneſs in thoſe parts, or heat and ſwellings, or when the patient cannot bear to have it touched, it is a ſign the inteſtines are indiſpoſed.

Hippocrates alſo inquired into the ſtate of the pulſe, or the beating of the arteries. The moſt ancient phyſicians, however, and even Hippocrates himſelf, for a long time, by this word underſtood the violent pulſation that is felt in an inflamed part, without putting the fingers to it. It is obſerved by Galen, and other phyſicians, that Hippocrates touches on the ſubject of the pulſe more ſlightly than any other on which he treats. But that our celebrated phyſician underſtood ſomething even on this ſubject, is eaſily gathered from ſeveral paſſages in his writings; as when he obſerves, that in acute fevers the pulſe is very quick and very great; and when he makes mention, in the ſame place, of trembling pulſes, and thoſe that beat ſlowly; when he obſerves, that in ſome diſeaſes incident to women, when the pulſe ſtrikes the finger faintly, and in a languiſhing manner, it is a ſign of approaching death. He remarks alſo, in the Coacæ Prænotiones, that he whoſe vein, that is to ſay whoſe artery of the elbow, beats, is juſt going to run mad, or elſe that the perſon is at that time very much under the influence of anger. Many other variations of the pulſe are enumerated by phyſicians, but moſt of them uncertain, and not confirmed by experience. See the Article PULSE, in the Medical Part of the Herbal, p. 106. where the ſubject is more fully treated.

We ſhall now proceed to ſome farther remarks on the PROGNOSTICS OF PARTICULAR DISEASES.

The *tertian ague* hath one prognoſtic peculiar to itſelf, namely, dry ſcabby ulcers breaking out upon the lips; theſe ſometimes appear about the third or fourth paroxyſm; and then we may venture to foretel that the diſeaſe will go off ſpontaneouſly after the ſeventh.

The following are the prognoſtics of a *nervous fever;* and therefore, when they appear, people ſhould take precautions accordingly, by conſulting the Medical Part of the Herbal, p. 128, for a ſafe and certain preventative and cure. The patient at firſt grows ſomewhat liſtleſs, and feels ſlight chills, and ſhudders, with uncertain ſluſhes of heat, and a kind of wearineſs all over, like what is felt after great fatigue. This is always attended with a ſort of heavineſs and dejection of ſpirits, and more or

leſs

leſs of a load, pain, or giddineſs of the head; a naufea, or diſreliſh of every thing, ſoon follows, without any conſiderable thirſt, but frequently with urging to vomit, though little but inſipid phlegm is brought up. Though a kind of lucid interval of ſeveral hours ſometimes intervenes, yet the ſymptoms return with aggravation, eſpecially towards night; the head grows more giddy or heavy; the heat greater; the pulſe quicker, but weak; with an oppreſſive kind of breathing. A great torpor, or obtuſe pain and coldneſs, affects the hinder-part of the head frequently, and oftentimes a heavy pain is felt on the top all along the coronary future; this, and that of the back part of the head, generally attend nervous fevers, and are commonly ſucceeded by ſome degree of delirium. In this condition the patient often continues for five or ſix days, with a heavy, pale, ſunk, countenance, ſeemingly not very ſick, and yet far from being well; reſtleſs, anxious, and commonly quite void of ſleep, though ſometimes very drowſy and heavy: but, although he appears to thoſe about him actually to ſleep, he is utterly inſenſible of it, and denies that he doth ſo. The pulſe during all this time is quick, weak, and unequal; ſometimes fluttering, and ſometimes for a few moments ſlow; nay, even intermitting, and then, with a ſudden fluſh in the face, immediately very quick, and perhaps ſoon after ſurpriſingly calm and equal; and thus alternately.

Prognoſtics of a *ſcarlet fever*. With various general ſymptoms of fever, the patient at firſt complains of a dejection of ſpirits, a ſlight ſoreneſs or rather ſtiffneſs in the neck, with a ſenſe of ſtraitneſs in the muſcles of the neck and ſhoulders, as if they were bound with cords. The ſecond day of the fever this ſoreneſs in the throat increaſes, and the patient finds a difficulty in ſwallowing; but the difficulty ſeems leſs occaſioned by the pain excited in the attempt, or by the ſtraitneſs of the paſſage, than by an inability to throw the neceſſary muſcles into action. The ſkin feels hot and dry, but not hard; and the patients experience frequent ſmall pungent pains, as if touched with the point of a needle. The breath is hot and burning to the lips, and thirſt makes them wiſh to drink; but the tendency to ſickneſs, and the exertions neceſſary in deglution, are ſo unpleaſant, that they ſeldom care to drink much at a time. They have much uneaſineſs alſo from want of reſt during the night. In the morning of the third day, the face, neck, and breaſt, appear redder than uſual: in a few hours this redneſs becomes univerſal; and increaſes to ſuch a degree of intenſity, that the face, body, and limbs, reſemble a boiled lobſter in colour, and are evidently ſwollen.

The ſigns of an impending *phrenitis*, or *inflammation of the brain*, are fully explained in the Medical Part of this work, p. 139. In this diſeaſe, the following are the moſt fatal ſymptoms: A continual and furious delirium, with watching; thin watery

urine, white fæces, the urine and ſtools running off involuntarily, or a total ſuppreſſion of theſe excretions; a diſpoſition to become ſtupid, or to faint, trembling, rigour, chattering of the teeth, convulſions, hiccough, coldneſs of the extremities, trembling of the tongue, ſhrill voice, a ſudden ceſſation of pain, with apparent tranquillity. The following are favourable: Sweats, apparently critical, breaking out; a ſeeming effort of nature to terminate the diſeaſe by a diarrhœa: a large hemorrhage from the noſe; ſwellings of the glands behind the ears; hæmorrhoids.

A *vertigo* is obſerved to be both the ſymptom and forerunner of ſome dangerous diſeaſe; ſuch as apoplexy, epilepſy, or hyſteria; hæmorrhages from the noſe and other parts; ſuppreſſion of the menſes; plethora; fevers, as well as ſuch as are accompanied with debility as thoſe in which there is an increaſed impetus of the blood towards the head.—Though a vertigo be for the moſt part a ſymptom and concomitant of other diſeaſes, yet it is ſometimes a primary diſeaſe, returning at intervals, increaſing gradually, and equally impeding and deſtroying the functions of the body and mind.

A *delirium* accompanies fevers of many different kinds. Sometimes it is ſlight, eaſily removed, and ſcarcely to be accounted a bad ſign. Often, however, it is very violent, and one of the very worſt of ſigns, requiring the utmoſt care and attention. A delirium is either fierce or mild. The fierce delirium is preceded and accompanied by a redneſs of the countenance, a pain of the head, a great beating of the arteries, and noiſe in the ears; the eyes in the mean time looking red, inflamed, fierce, ſhining, and unable to bear the light; there is either no ſleep at all, or ſleep troubled with horrid dreams; the wonted manners are changed, an unuſual peeviſhneſs and ill-nature prevail. The depravation of judgment is firſt obſerved between ſleep and waking, and by the perſon's crediting his imagination, while the perceptions of ſenſe are neglected, and the ideas of memory occur in an irregular manner. Fury at laſt takes place, and ſometimes an unuſual and incredible degree of bodily ſtrength, ſo that ſeveral people can ſcarcely keep a ſingle patient in his bed. The mild delirium, on the contrary, is often accompanied with a weak pulſe, a pale collapſed countenance, and a vertigo when the patient ſits in an erect poſture; he is ſeldom angry, but often ſtupid, and ſometimes remarkably grieved and fearful. The loſs of judgment, as in the former kinds, is firſt perceived when the patient is half awake; but a temporary recovery enſues upon the admiſſion of the light and the converſation of friends. The patient mutters much to himſelf, and attends little to the things around him; at laſt, becoming quite ſtupid, he neither feels the ſenſation of hunger or thirſt, nor any of the other propenſities of nature, by which means the urine and excrements are voided involuntarily. As the

diſorder increaſes, it terminates in ſubſultus tendinum, tremors, convulſions, fainting, and death. The other ſpecies of delirium alſo frequently terminates in this, when the ſpirits and ſtrength of the patient begin to fail. The ſymptoms accompanying either of theſe kinds of delirium ſhow an unuſual, inordinate, and unequal, motion of the blood through the brain, and a great change in that ſtate of it which is neceſſary to the exerciſe of the mental powers. It is ſufficiently probable, that an inflammation of the brain, more or leſs violent and general, ſometimes takes place, although the ſigns of univerſal inflammation are frequently ſlight. This we learn from the diſſection of dead bodies, which often ſhow an univerſal redneſs of the brain or of ſome of its parts, or ſometimes an effuſion or ſuppuration.

The prognoſtics of the *malignant, putrid, or ulcerous, ſore throat,* are very different in different perſons. Sometimes a rigour, with fulneſs, and foreneſs of the throat and painful ſtiffneſs of the neck, are the firſt ſymptoms complained of. Sometimes alternate chills and heats, with ſome degree of giddineſs, drowſineſs, or head-ach, uſher in the diſtemper. It ſeizes others with much more feveriſh ſymptoms; great pain of the head, back, and limbs; a vaſt oppreſſion of the præcordia, and continual ſighing. Some grown perſons go about for whole days in a drooping ſtate, with much uneaſineſs and anxiety, till at laſt they are obliged to take to their beds.—Thus various is the diſeaſe at the onſet. But it commonly begins with chills and heats, load and pain of the head, foreneſs of throat, and hoarſeneſs; ſome cough, ſickneſs at ſtomach, frequent vomiting and purging, in children eſpecially, and ſometimes very ſevere; though a contrary ſtate is more common to the adult. There is commonly a very great dejection of ſpirits, very ſudden weakneſs, great heavineſs on the breaſt, and faintneſs, from the very beginning. The pulſe in general is quick, ſmall, and fluttering; though ſometimes heavy and undulating. The eyes heavy, reddiſh, and as it were weeping; the countenance often full, fluſhed, and bloated, though ſometimes pale and ſunk. The following are the prognoſtics in the diſeaſe:—If a gentle eaſy ſweat comes on the third or fourth day; if the pulſe becomes more ſlow, firm, and equal; if the ſloughs of the fauces caſt off in a kindly manner, and appear at the bottom tolerably clean, and florid; if the breathing is more ſoft and free, and ſome degree of vigour and quickneſs return in the eyes; all is well, and a ſalutary criſis follows ſoon, by a continuance of the ſweat, and a turbid, ſubſiding, farinaceous, urine, a plentiful expectortion, and a very large deſquamation of the cuticle. But if a rigour comes on, and the exanthemata ſuddenly diſappear or turn livid; if the pulſe grows very ſmall and quick, and the ſkin remains hot and parched as it were; the breathing more difficult, the eyes dead and glaſſy, the urine pale and limpid; a phrenzy or coma may be expected to ſucceed, with

with a coldiſh clammy ſweat on the face or extremities; life will now be deſpaired of, eſpecially if a ſingultus and choaking or gulping in the throat ſhould attend, with ſudden, liquid, involuntary, livid, ſtools, intolerably fetid.

Symptoms of the *croup*, or *inflammation of the glottis*. A hoarſeneſs, with ſome ſhrillneſs and ringing ſound, both in ſpeaking and coughing, as if the noiſe came from a brazen tube. At the ſame time there is a ſenſe of pain about the larynx, ſome difficulty of reſpiration, with a whizzing ſound in inſpiration, as if the paſſage of the air were ſtraitened. The cough which attends it is commonly dry; and, if any thing be ſpit up, it is a matter of a purulent appearance, and ſometimes films reſembling portions of a membrane. With all theſe ſymptoms, there is a frequency of pulſe, a reſtleſſneſs, and an uneaſy ſenſe of heat. When the internal fauces are viewed, they are ſometimes without any appearance of inflammation; but frequently a redneſs, and even ſwelling, appears; and ſometimes there is an appearance of matter like to that rejected by coughing, together with the ſymptoms now deſcribed, and particularly a great difficulty of breathing, and a ſenſe of ſtrangling in the fauces, by which the patient is ſometimes ſuddenly taken off.

In a *pleuriſy*, the pathognomonic ſigns are a cough, a difficulty of breathing, a pain of the ſide, and a continued fever; the adjunct ſigns are the various ſorts of matter expectorated, which are ſometimes bloody, ſometimes bilious, &c. When the pains, which at firſt affected one ſide only, ſhall afterwards ſpread into the other; or when, leaving the ſide firſt affected, they paſs entirely into the other; theſe are always marks of a dangerous diſeaſe. A delirium coming on during a pneumonic inflammation is always a ſymptom denoting much danger. Bleeding is the remedy chiefly to be depended on; and may be done in either arm, as the ſurgeon finds moſt convenient; and the quantity taken away ought in general to be as large as the patient's ſtrength will allow. Yet the patient muſt keep out of bed as much as he can bear; ſhould have plenty of warm diluting drinks, impregnated with vegetable acids, accompanied with nitre or ſome other cooling neutral ſalt; and the belly alſo ought to be kept open by emollient clyſters or cooling laxative medicines. Vomiting in the beginning is dangerous; but in a ſomewhat advanced ſtate of the diſeaſe emetics have been found the beſt means of promoting expectoration. Fomentations and poultices to the pained part have been found uſeful; but bliſtering is found to be much more effectual. A bliſter, however, ought not to be applied till at leaſt one bleeding hath been premiſed, as veneſection is leſs effectual when the irritation of a bliſter is preſent. If the diſeaſe be moderate, a bliſter may be applied immediately after the firſt bleeding; but in violent caſes, where it may be preſumed that a ſecond bleeding may ſoon be neceſſary after the firſt, it will

will be proper to delay the blifter till after the fecond bleeding, when it may be fuppofed that the irritation occafioned by the blifter will be over before a third bleeding becomes neceffary. It may frequently be of ufe in this difeafe to repeat the bliftering; and in that cafe the plafters fhould always be applied fomewhere on the thorax, for when applied to more diftant parts they have little effect. The keeping the bliftered parts open, and making what is called a perpetual blifter, has much lefs effect than a repeated bliftering. When this difeafe terminates unfavourably, it often ends in an empyema, which is occafioned by the effufion of a quantity of purulent matter into the cavity of the thorax, producing a lingering and painful diforder, very often incurable. The firft fign of an empyema is a ceffation of the pain in the breaft, which before was continual: this is followed by a fenfation of weight on the diaphragm; and a fluctuation of matter, fometimes making a noife that may be heard by the by-ftanders: the acute fever is changed into a hectic, with an exacerbation at night: a continual and troublefome dry cough remains. The refpiration is exceedingly difficult, becaufe the lungs are prevented by the matter from fully expanding themfelves. The patient can lie eafily on that fide where the matter is effufed, but not on the other, becaufe then the weight of the matter on the mediaftinum produces uneafinefs. The more the hectic heat is augmented, the more is the body emaciated, and its ftrength decayed. In fome there is danger of fuffocation when they ftoop down, which goes off when they alter that pofture of the body; and in fome there is a purulent fpitting.—Thefe fymptoms are accompanied with great anxiety, palpitation of the heart, and faintings. Very few recover after an empyema has been once formed, efpecially if the operation paracenteſis be neglected. After this operation is performed, if a great quantity of bloody fetid pus be difcharged, if the fever continue, and if the patient fpit up a purulent, pale, frothy, livid, or green, matter, with a decay of ftrength, there is no hope; but, when a fmall quantity of pus, of a white colour, not very fetid, is difcharged; when the fever and thirft prefently ceafe, the appetite returns, and fæces of a good conſiſtence are difcharged, the ftrength alfo returning in fome degree; there is then hope of a perfect recovery. If the matter be not dried up in feven weeks time, the difeafe readily changes to a fiſtulous ulcer, which is very difficult to cure. An empyema affecting both fides of the thorax is more dangerous than that which affects only one.

The *inflammation of the heart* is attended with all the fymptoms before mentioned, but in a higher degree; it is befides fometimes accompanied with hydrophobic fymptoms, fainting, palpitation of the heart, a feeming madnefs, a funk and irregular pulfe, watery eyes, and a dejected countenance, with a dry black tongue.

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The ſigns of an *inflammation of the ſtomach* are, great heat and pain in the epigaſtric region, extreme anxiety, an almoſt continual and painful hiccough, with a moſt painful vomiting of every thing taken into the ſtomach. This diſeaſe is always very dangerous, and the prognoſis doubtful, which alſo muſt always be in proportion to the ſeverity of the ſymptoms. A ceſſation of pain, coldneſs about the præcordia, great debility, with a languid and intermitting pulſe, and an abatement of the hiccough, denote a gangrene and ſpeedy death. From the ſenſibility of the ſtomach alſo, and its great connection with the reſt of the ſyſtem, it muſt be obvious that an inflammation of it, by whatever cauſes produced, may be attended with fatal conſequences; particularly by the great debility it produces, it may prove ſuddenly fatal, without running through the uſual courſe of inflammations.—Its tendency to admit of reſolution may be known by its having ariſen from no violent cauſe, by the moderate ſtate of the ſymptoms, and by a gradual remiſſion of theſe in the courſe of the firſt or at moſt of the ſecond week of the diſeaſe. The tendency to gangrene may be ſuſpected from the ſymptoms continuing with unremitting violence, notwithſtanding the uſe of proper remedies; and a gangrene already begun may be known by the ſymptoms above-mentioned, particularly great debility and ſudden ceſſation of pain. The tendency to ſuppuration may be known by the ſymptoms continuing but in a moderate degree for more than one or two weeks, and by a conſiderable remiſſion of the pain, while a ſenſe of weight and anxiety ſtill remains. When an abſceſs has been formed, the frequency of the pulſe is firſt abated, but ſoon after it increaſes, with frequent cold ſhivering, and an exacerbation in the afternoon and evening; followed by night-ſweats, and other ſymptoms of hectic fever. Theſe at length prove fatal, unleſs the abſceſs open into the cavity of the ſtomach, the pus be evacuated by vomiting, and the ulcer ſoon healed.

An *inflammation of the inteſtines* ſhows itſelf by a fixed pain in the abdomen, attended with fever, vomiting, and coſtiveneſs. The pain is often felt in different parts of the abdomen, but more frequently ſpreads over the whole, and is particularly violent about the navel. Inflammations of the inteſtines may ariſe from the ſame cauſe as thoſe from the ſtomach; though commonly the former will more readily occur from cold applied to the lower extremities, or to the belly itſelf. It is alſo found ſupervening on the ſpaſmodic cholic, incarcerated hernia, and volvulus. The inflammations of the inteſtines have the ſame termination with thoſe of the ſtomach; and the prognoſis in both caſes is much the ſame.

Inflammation of the liver is attended with conſiderable fever; a frequent, ſtrong, and hard, pulſe; high-coloured urine; an acute pain in the right hypochondrium, increaſed by preſſing upon the part. The pain is very often in ſuch a part of the ſide as to make it appear like a pleuriſy: and frequently, like that, is iucreaſed on inſpi-

ration. The diſeaſe is alſo commonly attended with a cough, which is generally dry, but ſometimes moiſt; and, when the pain thus reſembles a pleuriſy, the patient cannot lie eaſily except upon the ſide affected. The pain is frequently extended to the clavicle, and to the top of the ſhoulder; and is attended ſometimes with hiccough, and ſometimes with vomiting. The inflammation of the liver, like others, may end by reſolution, ſuppuration, or gangrene; and the tendency to the one or to the other of thoſe events may be known from what has been already mentioned.

Inflammation of the ſpleen, comes on with a remarkable ſhivering, ſucceeded by a moſt intenſe heat and very great thirſt; a pain and tumour are perceived in the left hypochondrium, and the paroxyſms for the moſt part aſſume a quartan form. When the patients expoſe themſelves for a little to the free air, their extremities immediately grow very cold. If an hæmorrage happens, the blood flows out of the left noſtril.

It is often a very difficult matter to diſtinguiſh rheumatiſm from gout: but in *rheumatiſm* there in general occurs much leſs affection of the ſtomach; it affects chiefly the large joints, and often ſeveral of them at the ſame time: it occurs at an earlier period of life than gout; it is not obſerved to be hereditary; and it can in general be traced to ſome obvious exciting cauſe, particularly to the action of cold. To diſtinguiſh the chronic rheumatiſm from the acute: When the pains are ſtill ready to ſhift their place; when they are eſpecially ſevere in the night-time; when, at the ſame time, they are attended with ſome degree of pyrexia, and with ſome ſwelling, and eſpecially ſome redneſs, of the joints; the diſeaſe is to be conſidered as partaking of the nature of the acute rheumatiſm. But when there is no longer any degree of pyrexia remaining; when the pained joints are without redneſs; when they are cold and ſtiff; when they cannot eaſily be made to ſweat; or when, while a free and warm ſweat is brought out on the reſt of the body, it is only clammy and cold on the pained joints; and when, farther, the pains of theſe are increaſed by cold, and relieved by heat, applied to them, the caſe is to be conſidered as that of a purely chronic rheumatiſm: or perhaps more properly the firſt of the conditions now deſcribed may be termed the ſtate of irritability, and the ſecond the ſtate of atony. The chronic rheumatiſm, or rather the atonic, may affect different joints; but is eſpecially apt to affect thoſe which are ſurrounded with many muſcles, and thoſe of which the muſcles are employed in the moſt conſtant and vigorous exertions. Such is the caſe of the vertebræ of the loins, the affection of which is namd *lumbago;* or of the hip-joint, when the diſeaſe is named *iſchias* or *ſciatica.* Violent ſtrains and ſpaſms, occurring on ſudden and ſomewhat violent exertions, bring on rheumatic affections, which at firſt partake of the chronic rheumatiſm. Such are frequently the lumbago, and other affections which ſeem to be more ſeated in the muſcles than in the joints. The diſtinction of the rheumatic pains from thoſe reſembling them which occur in the ſiphilis and ſcurvy

muſt be obvious, either from the ſeat of the pains or from the concomitant ſymptoms peculiar to thoſe diſeaſes.

What we call a paroxyſm of the *gout* is principally conſtituted by an inflammatory affection of ſome of the joints. This ſometimes comes on ſuddenly, without any warning, but is generally preceded by ſeveral ſymptoms; ſuch as the ceaſing of a ſweating which the feet had been commonly affected with before; an unuſual coldneſs of the feet and legs; a frequent numbneſs, alternating with a ſenſe of pricking along the whole of the lower extremities; frequent cramps of the muſcles of the legs; and an unuſual turgeſcence of the veins. While theſe ſymptoms take place in the lower extremities, the body is affected with ſome degree of torpor and languor, and the functions of the ſtomach in particular are more or leſs diſturbed. The appetite is diminiſhed; and flatulency, or other ſymptoms of indigeſtion, are felt. Theſe ſymptoms take place for ſeveral days, ſometimes for a week or two, before a paroxyſm comes on; but commonly, upon the day immediately preceding it, the appetite becomes keener than uſual.

It is generally ſuppoſed, that there are ſome caſes of rheumatiſm which are ſcarcely to be diſtinguiſhed from the gout: theſe, however, Dr. Cullen thinks, are but few; and that the two diſeaſes may be for the moſt part diſtinguiſhed with great certainty, by obſerving the pre-diſpoſition, the antecedent circumſtances, the part affected, the recurrences of the diſeaſe, and its connection with the ſyſtem; which circumſtances, for the moſt part, appear very differently in the two diſeaſes.

Prognoſtics that a perſon is affected with the *plague*: 1. Great loſs of ſtrength. 2. Stupor, giddineſs, and conſequent ſtaggering, which reſembles drunkenneſs; or the head-ach and various delirium. 3. Anxiety, palpitation, ſyncope, and eſpecially the weakneſs and irregularity of the pulſe, denoting a conſiderable diſturbance in the action of the heart. 4. Nauſea and vomiting, particularly the vomiting of bile, which ſhow an accumulation of vitiated bile in the gall-bladder and biliary ducts, and from thence derived into the inteſtines and ſtomach; which alſo denote a conſiderable ſpaſm, and loſs of tone in the extreme veſſels on the ſurface of the body.

The *ſmall-pox* begins with a ſynocha, or inflammatory fever. It generally comes on about mid-day, with ſome ſymptoms of a cold ſtage, and commonly with a conſiderable languor and drowſineſs. A hot ſtage is ſoon formed, and becomes more conſiderable on the ſecond and third day. During this courſe children are liable to frequent ſtartings from their ſlumbers; and adults, if they are kept in bed, are diſpoſed to much ſweating. On the third day, children are ſometimes affected with one or two epileptic fits; and towards the end of the third day the eruption commonly appears. The principal marks by which the *chicken-pox* may be diſtinguiſhed from the ſmall-pox are, 1. The appearance, on the ſecond or third day of the eruption, of that veſicle full of ſerum upon the top of the pock. 2. The cruſt, which covers

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the pocks on the fifth day; at which time thoſe of the ſmall-pox are not at the height of their ſuppuration. Foreign medical writers hardly ever mention the name of the chicken-pox; and the writers of our own country ſcarcely mention any thing more of it than its name. Morton ſpeaks of it as if he ſuppoſed it to be a very mild genuine ſmall-pox. But theſe two diſtempers are ſurely totally different from one another, not only on account of their different appearances above-mentioned, but becauſe thoſe who have had the ſmall-pox are capable of being infected with the chicken-pox; but thoſe who have once had the chicken-pox are not capable of having it again, though to ſuch as have never had this diſtemper it ſeems as infectious as the ſmall-pox. Dr. Heberden wetted a thread in the moſt concocted pus-like liquor of the chicken-pox which he could find; and, after making a ſlight inciſion, it was confined upon the arm of one who had formerly had it; the little wound healed up immediately, and ſhowed no ſigns of any infection. From the great ſimilitude between the two diſtempers, it is probable, that, inſtead of the ſmall-pox, ſome perſons have been inoculated from the chicken-pox; and that the diſtemper which has ſucceeded has been miſtaken for the ſmall-pox by haſty or inexperienced obſervers.

It is a promiſing ſign, in the *palſy*, when the patient feels a ſlight degree of painful itching in the affected parts; and, if a fever ſhould ariſe, it bids fair to cure the palſy. When the ſenſe of feeling remains, there is much more room to hope for a cure than when it is gone, as well as the power of motion. But, when we obſerve the fleſh to waſte, and the ſkin to appear withered and dry, we may look upon the diſeaſe to be incurable. Convulſions ſupervening on a palſy are a fatal ſign.

When *fainting* happens in the beginning of any acute diſtemper, it is not a good omen; but, when it takes place in the increaſe or at the height of the diſeaſe, the danger is ſomewhat leſs; but in general, when fainting comes on without any evident cauſe, it is to be dreaded. In violent hæmorrhages it is favourable; as the bleeding veſſels gain time to contract and recover themſelves, and thus the patient may eſcape. When perſons of a full habit faint through exceſs of paſſion, they ought to be bled without delay, and ſhould drink vinegar or lemon-juice diluted with water; and, after the bowels are emptied by a clyſter, take a paregoric draught, and go to bed.

Prognoſtics from *convulſions*. Except in ſome few caſes, convulſive diſorders are always to be dreaded; but leſs in young people than in ſuch as are advanced in life. Thoſe which attack girls under the age of puberty will generally ceaſe on the appearance of the menſes; and boys have likewiſe a chance of being relieved as they advance in life: but in grown-up people, unleſs the cauſe be very evident, a cure is hardly to be expected, eſpecially after the diſeaſe has been of long continuance. The treatment is much the ſame with that of epilepſy.

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The *epilepſy* frequently is preceded by a pain in the head, laſſitude, ſome diſturbance of the ſenſes, unquiet ſleep, unuſual dread, dimneſs of ſight, a noiſe in the ears, palpitation of the heart, coldneſs of the joints; and in ſome there is a ſenſation of formication, or a cold-air, &c. aſcending from the lower extremities toward the head. If the epilepſy comes on before the time of puberty, there are ſome hopes of its going off at that time. But it is a bad ſign when it attacks about the twenty-firſt year, and ſtill worſe if the fits grow more frequent; for then the animal functions are often deſtroyed, as well as thoſe of the mind, and the patient becomes ſtupid and fooliſh. Sometimes it will terminate in melancholy or madneſs, and ſometimes in a mortal apoplexy or palſy. It has ſometimes, however, been obſerved that epilepſies have been removed by the appearance of cutaneous diſeaſes, as the itch, ſmall-pox, meaſles, &c. therefore, if any of theſe appear, it may be reckoned a favourable prognoſtic.

Signs of a *diabetes.*—The diabetes firſt ſhows itſelf by a dryneſs of the mouth and thirſt, white frothy ſpittle, and the urine in ſomewhat larger quantity than uſual. A heat begins to be perceived in the bowels, which at firſt is a little pungent, and gradually increaſes. The thirſt continues to augment by degrees, and the patient by degrees loſes the power of retaining his urine for any length of time. The moſt ſingular phenomenon in this diſeaſe is, that the urine ſeems to be entirely or very much diveſted of an animal nature, and to be largely impregnated with a ſaccharine ſalt, ſcarcely diſtinguiſhable from that obtained from the ſugar-cane. For this diſcovery we are indebted to Dr. Dobſon of Liverpool, who made ſome experiments on the urine of a perſon labouring under a diabetes, who diſcharged 28 pints of urine every day, taking during the ſame time from 12 to 14 pounds only of ſolid and liquid food. When a perſon perceives any of the beforementioned ſymptoms upon him, (particularly the quantity and inſipidity of the urine,) he ſhould loſe no time in taking the proper precautions; for the diabetes is rarely cured unleſs when taken at the very beginning, which is ſeldom done. Briſtol water is reckoned a ſpecific in this diſorder.

Hydrophobia.—This diſeaſe commonly does not make its attacks till a conſiderable time after the bite. In ſome few inſtances it has commenced in ſeven or eight days from the accident; but generally the patient continues in health for twenty, thirty, or forty, days, or even much longer. The wound, if not prevented, will in general be healed long before that time, frequently with the greateſt eaſe; though ſometimes it reſiſts all kinds of healing applications, and forms a running ulcer, which diſcharges a quantity of matter for many days. It has been ſaid, that the nearer the wounded place is to the ſalivary glands, the ſooner the ſymptoms of hydrophobia appear. The approach of the diſeaſe is known by the cicatrix of the

wound becoming hard and elevated, and by a peculiar ſenſe of pricking at the part; pains ſhoot from it towards the throat; ſometimes it is ſurrounded with livid or red ſtreaks, and ſeems to be in a ſtate of inflammation; though frequently there is nothing remarkable to be obſerved about it. The patient becomes melancholy, loves ſolitude, and has ſickneſs at ſtomach. Sometimes the peculiar ſymptom of the diſeaſe, the dread of water, comes on all at once. We have an inſtance of one who, having taken a vomit of ipecacuanha for the ſickneſs he felt at his ſtomach, was ſeized with the hydrophobia at the time he was drinking the warm water. Sometimes the diſeaſe begins like a common ſore throat; and, the ſoreneſs daily increaſing, the hydrophobic ſymptoms ſhow themſelves like a convulſive ſpaſm of the muſcles of the fauces. In others, the mind ſeems to be primarily affected, and they have a real dread of water or any liquid before they try whether they can ſwallow it or not. Dr. James, in his Treatiſe on Canine Madneſs, mentions a boy ſent out to fill two bottles with water, who was ſo terrified by the noiſe of the liquid running into them, that he fled into the houſe crying out that he was bewitched. He mentions alſo the caſe of a farmer, who, going to draw ſome ale from a caſk, was terrified to ſuch a degree at its running into the veſſel, that he ran out in great haſte with the ſpigot in his hand. But, in whatever manner this ſymptom comes on, it is certain that the moſt painful ſenſations accompany every attempt to ſwallow liquids. Nay, the bare ſight of water, of a looking-glaſs, or of any thing clear or pellucid, will give the utmoſt uneaſineſs, and even throw the patient into convulſions. With regard to the affection of the mind itſelf in this diſeaſe, it does not appear that the patients are deprived of reaſon. Some have, merely by the dint of reſolution, conquered the dread of water, though they never could conquer the convulſive motions which the contact of liquids occaſioned: yet even this reſolution has been of no avail; for the convulſions and other ſymptoms, increaſing, have almoſt always deſtroyed the unhappy patients. However, in this diſtemper the ſymptoms are ſo various, that they cannot be enumerated; for we ſeldom read two caſes of hydrophobia which do not differ very remarkably in this reſpect. When a perſon is bitten, the prognoſis with regard to the enſuing hydrophobia is very uncertain. All thoſe who are bit do not fall into the diſeaſe; nay, Dr. Vaughan relates that, out of thirty bitten by a mad dog, only one was ſeized with the hydrophobia. During the interval betwixt the bite and the time of the diſeaſe comes on, there are no ſymptoms by which we can certainly judge whether it will appear or not.

Prognoſtics of a *dropſy of the breaſt*.—This affection, particularly with reſpect to its cauſes, is in many circumſtances ſimilar to other kinds of dropſy, particularly to aſcites. But from the ſituation of the water, which is here depoſited in the cavity of

of the thorax, it may naturally be ſuppoſed that ſome peculiar ſymptoms will occur. Beſides the common ſymptoms of dropſy, (paleneſs of the countenance, ſcarcity of urine, and the like,) this diſeaſe is, in ſome inſtances, attended with a fluctuation of water within the breaſt; which, when it does occur, may be conſidered as a certain diſtinguiſhing mark of this affection. But, beſides this, it is alſo diſtinguiſhed by the remarkable affections of circulation and reſpiration with which it is attended. The breathing is peculiarly difficult, eſpecially in a recumbent poſture; and in many inſtances patients cannot breathe with tolerable eaſe unleſs when ſitting erect, or even ſtooping ſomewhat forward. The pulſe is very irregular, and has often remarkable intermiſſions. But the diſeaſe has been thought to be principally characterized by a ſudden ſtarting from ſleep, in conſequence of an almoſt inexpreſſible uneaſy ſenſation referred to the breaſt, and attended with ſtrong palpitation, which may probably ariſe from an affection either of circulation or of reſpiration. That theſe ſymptoms are common attendants of this diſeaſe is undeniable; and they are certainly the beſt characteriſtics of it with which we are yet acquainted: but it muſt be allowed that they are preſent in ſome caſes where there is no water in the breaſt; and that in other inſtances, where the diſeaſe exiſts, they are either altogether wanting, or occur only in a very ſlight degree. Certain diagnoſtics, therefore, of this diſeaſe ſtill remain to be diſcovered. When hydrothorax is preſent, from the affection of the vital functions with which it is attended, it may readily be concluded that it is a dangerous diſeaſe; and in many inſtances it proves fatal. The cure, as far as it can be accompliſhed, is obtained very much on the ſame principles as in other dropſies. Benefit is often obtained from an artificial diſcharge of water by the application of bliſters to the breaſt; but in this, as well as other dropſies, a diſcharge is chiefly effected by the natural outlets, particularly from the uſe of cathartics and diuretics. In this ſpecies of dropſy, more perhaps than in any other, recourſe has been had to the uſe of the digitalis purpurea, or fox-glove, ſo ſtrongly recommended as a diuretic by Dr. Withering in his Treatiſe reſpecting the uſe of it. There can be no doubt that this, though ſometimes productive of inconvenience, from the diſtreſſing ſickneſs and ſevere vomiting which it not unfrequently excites, even in ſmall doſes, often operates as a powerful diuretic, and produces a complete evacuation of water, after other remedies have failed. From the effects mentioned above, however, as well as from its influence on the pulſe, which it renders much ſlower, it is neceſſary that it ſhould be employed with great caution and in ſmall doſes. A dram of the dried leaves of the digitalis, macerated for four hours in half a pint of warm water, forms an infuſion which may be given in doſes of an ounce, and the dried powder of the leaves in doſes of one or two grains: theſe doſes may be gradually increaſed, and repeated twice or oftener in the day;

but

but this requires to be done with great caution, leſt ſevere vomiting or other diſtreſſing ſymptoms ſhould take place.

Scurvy.—The firſt indication of the ſcorbutic diatheſis is generally a change of colour in the face, from the natural and healthy look to a pale and bloated complexion, with a liſtleſſneſs, and averſion from every ſort of exerciſe; the gums ſoon after become itchy, ſwell, and are apt to bleed on the ſlighteſt touch; the breath grows offenſive; and the gums, ſwelling daily more and more, turn livid, and at length become extremely fungous and putrid, as being continually in contact with the external air; which in every caſe favours the putrefaction of ſubſtances diſpoſed to run into that ſtate, and is indeed abſolutely requiſite for the production of actual rottenneſs. The ſymptoms of the ſcurvy, like thoſe of every other diſeaſe, are ſomewhat different in different ſubjects, according to the various circumſtances of conſtitution; and they do not always proceed in the ſame regular courſe in every patient. But what is very remarkable in this diſeaſe, notwithſtanding the various and immenſe load of diſtreſs under which the patients labour, there is no ſickneſs at the ſtomach, the appetite keeps up, and the ſenſes remain entire almoſt to the very laſt: when lying at reſt, they make no complaints, and feel little diſtreſs or pain: but, the moment they attempt to riſe or ſtir themſelves, then the breathing becomes difficult, with a kind of ſtraitneſs or catching, and great oppreſſion, and ſometimes they have been known to fall into a ſyncope. This catching of the breath upon motion, with the loſs of ſtrength, dejection of ſpirits, and rotten gums, are held as the eſſential or diſtinguiſhing ſymptoms of the diſeaſe.

The *jaundice* firſt ſhows itſelf by a liſtleſſneſs and want of appetite: the patient becomes dull, oppreſſed, and generally coſtive. Theſe ſymptoms have continued but a very ſhort time, when a yellow colour begins to diffuſe itſelf over the *tunica albuginea*, or white part of the eye, and the nails of the fingers; the urine becomes high coloured, with a yellowiſh ſediment capable of giving a yellow tint to linen; the ſtools are whitiſh or grey. In ſome there is a moſt violent pain in the epigaſtric region, which is conſiderably increaſed after meals. In ſome the diſeaſe degenerates into an incurable dropſy; and there have been many inſtances of people who have died of the dropſy after the jaundice itſelf had been totally removed. The coming on of a gentle diarrhœa, attended with bilious ſtools, together with the ceſſation of pain, are ſigns of the diſeaſe being cured. We are not, however, always to conclude, becauſe the diſeaſe is not attended with acute pain, that it is therefore incurable; for frequently the paſſage of a concretion through the biliary ducts is accompanied only with a ſenſation of ſlight uneaſineſs. If the diſeaſe goes off, its return muſt be prevented by a courſe of tonic medicines, particularly the Peruvian bark and antiſeptics: but we can by no means be certain that the jaundice will not return,

and that at any interval; for there may be a number of concretions in the gall-bladder, and, though one hath paſſed, another may very quickly follow, and produce a new fit of jaundice; and thus ſome people have continued to be affected with the diſtemper, at ſhort intervals, during life.

Stone in the bladder.—The ſigns of a ſtone in the bladder are, pain, eſpecially about the ſphincter; and bloody urine, in conſequence of riding or being jolted in a carriage: a ſenſe of weight in the perinæum; an itching of the glans penis; ſlimy ſediment in the urine; and frequent ſtoppages in making water; a teneſmus alſo comes on while the urine is diſcharged.

Imaginary viſion of objects which do not exiſt.—This often takes place when the body is diſeaſed, and then the patient is ſaid to be delirious. Sometimes however, in theſe caſes, it does not amount to delirium; but the perſon imagines he ſees gnats or other inſects flying before his eyes; or ſometimes, that every thing he looks at has black ſpots in it, which laſt is a very dangerous ſign. Sometimes alſo ſparks of fire appear before his eyes; which appearances are not to be diſregarded, as they frequently precede apoplexy or epilepſy: on the other hand, it is feared that little benefit can be derived from an attention to this prognoſtic, as the fits commonly follow ſo ſuddenly.

I ſhall now proceed to deſcribe two diſorders not noted by Culpeper, or any old writer. And firſt of the

ANGINA PECTORIS.

Dr. Heberden was the firſt who deſcribed this diſeaſe, though it is extremely dangerous, and, by his account, not very rare. It ſeizes thoſe who are ſubject to it when they are walking, and particularly when they walk ſoon after eating, with a moſt diſagreeable and painful ſenſation in the breaſt, which ſeems to threaten immediate deſtruction: but, the moment they ſtand ſtill, all the uneaſineſs vaniſhes. In all other reſpects the patients at the beginning of this diſorder are well, and have no ſhortneſs of breath After it has continued ſome months, the fits will not ceaſe inſtantaneouſly on ſtanding ſtill; and it will come on not only when the patients are walking, but when they are lying down, and oblige them to riſe up out of their beds every night for many months together. In one or two very inveterate caſes, it has been brought on by the motion of a horſe or carriage, and even by ſwallowing, coughing, going to ſtool, ſpeaking, or by any diſturbance of mind. The perſons affected were all men, almoſt all of whom were above fifty years of age, and moſt of them with a ſhort neck

and inclining to be fat. Something like it, however, was obſerved in one woman, who was paralytic; and one or two young men complained of it in a ſlight degree. Other practitioners have obſerved it in very young perſons. When a fit of this ſort comes on by walking, its duration is very ſhort, as it goes off almoſt immediately upon ſtopping. If it comes on in the night, it will laſt an hour or two. Dr. Heberden met with one in whom it once continued for ſeveral days; during all which time the patient ſeemed to be in imminent danger of death. Moſt of thoſe attacked with the diſtemper died ſuddenly: though this rule was not without exceptions; and Dr. Heberden obſerved one who ſunk under a lingering illneſs of a different nature. The os ſterni is uſually pointed to as the ſeat of this malady; but it ſeems as if it was under the lower part of that bone, and at other times under the middle or upper part, but always inclining more to the left ſide; and in many caſes there is joined with it a pain about the middle of the left arm, which appears to be ſeated in the biceps muſcle.

The appearance of Dr. Heberden's paper in the Medical Tranſactions very ſoon raiſed the attention of the faculty, and produced other obſervations from phyſicians of eminence; namely, Dr. Fothergill, Dr. Wall of Worceſter, Dr. Haygarth of Cheſter, and Dr. Percival of Mancheſter. It alſo induced an unknown ſufferer to write Dr. Heberden a very ſenſible letter, deſcribing his feelings in the moſt natural manner; which unfortunately, in three weeks after the date of this anonymous epiſtle, terminated in a ſudden death, as the writer himſelf had apprehended. The youngeſt ſubject that Dr. Fothergill ever ſaw afflicted with this diſorder was about thirty years of age; and this perſon was cured. The method that ſucceeded him was a courſe of pills, compoſed of the maſs of gum-pill, ſoap, and native cinnabar, with a light chalybeate bitter: this was continued for ſome months, after which he went to Bath ſeveral ſucceſſive ſeaſons, and acquired his uſual health: he was ordered to be very ſparing in his diet; to keep the bowels open; and to uſe moderate exerciſe on horſeback, but not to take long or fatiguing walks. The only ſymptom in this patient that is mentioned, was a ſtricture about the cheſt, which came on if he was walking up hill or a little faſter than ordinary, or if he was riding a very briſk trot; for moderate exerciſe of any kind did not affect him; and this uneaſy ſenſation always obliged him to ſtop, as he felt himſelf threatened with immediate death if he had continued to go forwards. It is the ſharp conſtrictive pain acroſs the cheſt, that (according to Dr. Fothergill's obſervation) particularly marks this ſingular diſeaſe; and which is apt to ſupervene upon a certain degree of muſcular motion, or whatever agitates the nervous ſyſtem. In ſuch caſes as fell under the inſpection of Dr. Fothergill, he very ſeldom met with one that was not attended with an irregular and intermitting pulſe; and this, not only during the exacerbations,

but

but often when the patient was free from pain and at reſt; but Dr. Heberden obſerves, that the pulſe is, at leaſt ſometimes, not diſturbed; and mentions his having once had an opportunity of being convinced of this circumſtance, by feeling the pulſe during the paroxyſm. But no doubt theſe varieties, as well as many other little circumſtances, will occur in this diſeaſe, as they do in every other, on account of the diverſity of the human frame; and, if thoſe which in general are found to predominate and give the diſtinguiſhing character be preſent, they will always authoriſe us in giving the name to the diſeaſe: thus, when we find the conſtrictory pain acroſs the cheſt, accompanied with a ſenſe of ſtrangling or ſuffocation; and ſtill more, if this pain ſhould ſtrike acroſs the breaſt into one or both arms; we ſhould not heſitate to pronounce the caſe an angina pectoris.

As to the nature of this diſeaſe, it appears to be purely ſpaſmodic: and this opinion will readily preſent itſelf to any one who conſiders the ſudden manner of its coming on and going off; the long intervals of perfect eaſe; the relief afforded by wine and ſpirituous cordials; the influence which paſſionate affections of the mind have over it; the eaſe which comes from varying the poſture of the head and ſhoulders, or from remaining quite motionleſs; the number of years for which it will continue, without otherwiſe diſordering health; its bearing ſo well the motion of a horſe or carriage, which circumſtance often diſtinguiſhes ſpaſmodic pains from thoſe which ariſe from ulcers; and laſtly, its coming on for the moſt part after a full meal, and in certain patients at night, juſt after the firſt ſleep, at which time the incubus, convulſive aſthma, and other ills juſtly attributed to the diſordered functions of the nerves, are peculiarly apt to return or to be aggravated. From all theſe circumſtances taken together, there can be little doubt that this affection is of a ſpaſmodic nature: but, though this ſhould be admitted, it may not be ſo eaſy to aſcertain the particular muſcles which are thus affected. The violent ſenſe of ſtrangling or choaking which ſhows the circulation through the lungs to be interrupted during the height of the paroxyſm; and the peculiar conſtrictive pain under the ſternum, always inclining (according to Dr. Heberden's obſervation) to the left ſide; together with that moſt diſtreſſing and alarming ſenſation, which, if it were to increaſe or continue, threatens an immediate extinction of life; might authoriſe us to conclude that the heart itſelf is the muſcle affected: the only objection to this idea (and, if it had been conſtantly obſerved, it would be inſurmountable) is, that the pulſe is not always interrupted during the paroxyſm. The appearances in two of the diſſections favour the opinion that the ſpaſm affects the heart; as in one ſubject the left ventricle (and, though it be not mentioned, we may preſume the right one alſo) was found as empty of blood as if it had been waſhed; and in another, the ſubſtance of the heart appeared whitiſh, not unlike a ligament; as it ſhould ſeem, in both caſes, from the force

of

of the ſpaſm ſqueezing the blood out from the veſſels and cavities. If this hypotheſis be allowed, we muſt conclude that the ſpaſm can only take place in an inferior degree, as long as the patient continues to ſurvive the paroxyſm; ſince an affection of this ſort, and in this part, of any conſiderable duration or violence, muſt inevitably prove fatal: and accordingly, as far as could be traced, the perſons who have been known to labour under this diſeaſe have in general died ſuddenly. The diſſections alſo ſhow, that, whatever may be the true ſeat of the ſpaſm, it is not neceſſary for the bringing of it on, that the heart, or its immediate appendages, ſhould be in a morbid ſtate; for in three out of the ſix that have as yet been made public, theſe parts were found in a ſound ſtate. On opening the body of the gentleman who wrote the letter to Dr Heberden, "upon the moſt careful examination, no manifeſt cauſe of his death could be diſcovered; the heart, in particular, with its veſſels and valves, were all found in a natural condition." In the caſe communicated by Dr. Percival to the publiſhers of the Edinburgh Medical Commentaries, "the heart and aorta deſcendens were found in a ſound ſtate." And in Dr. Haygarth's patient, on opening the thorax, the lungs, pericardium, and heart, appeared perfectly ſound. Not to mention Dr. Fothergill's patient (R. M.), in whoſe body the only morbid appearance about the heart was a ſmall white ſpot near the apex. So that the cauſe, whatever its nature might have been, was at too great a diſtance, or of too ſubtle a nature, to come under the inſpection of the anatomiſt. But there was a circumſtance in two of the ſubjects that is worthy of remembrance; and which ſhows that the craſis of the blood, while they were living, muſt have been greatly injured; namely, its not coagulating, but remaining of a cream-like conſiſtence, without any ſeparation into ſerum and craſſamentum.

From all that we have ſeen hitherto publiſhed, it does not appear that any conſiderable advances have been made towards the actual cure of this anomalous ſpaſm. The very judicious and attentive Dr. Heberden (to whom the public are highly indebted for firſt making the diſorder known) confeſſes, that bleeding, vomits, and other evacuations, have not appeared to do any good: wine and cordials, taken at bed-time, will ſometimes prevent or weaken the fits; but nothing does this ſo effectually as opiates: in ſhort, the medicines uſually called nervous or cordial, ſuch as relieve and quiet convulſive motions, and invigorate the languiſhing principle of life, are what he recommends. Dr. Wall mentions one patient, out of the twelve or thirteen that he had ſeen, who applied to him early in the diſeaſe, and was relieved conſiderably by the uſe of antimonial medicines joined with the fetid gums: he was ſtill living at the time the doctor wrote his paper, (Nov. 1772.) and going about with tolerable eaſe. Two were carried off by other diſorders; all the reſt died ſuddenly. Dr. Fothergill's directions are chiefly calculated with the view to prevent the

diſorder from gaining ground, and to alleviate preſent diſtreſs. Accordingly he enjoins ſuch a kind of diet as may be moſt likely to prevent irritability: in particular not to eat voraciouſly: to be ſtrictly abſtemious in reſpect to every thing heating; ſpices, ſpirits, wines, and all fermented liquors: to guard moſt ſcrupulouſly againſt paſſion, or any vehement emotions; and to make uſe of all the uſual means of eſtabliſhing and preſerving general health; to mitigate exceſſes of irritability by anodynes; or pains, if they quicken the circulation: to diſperſe flatulencies, when they diſtend the ſtomach, by moderate doſes of carminatives; amongſt which, perhaps, ſimple peppermint-water may be reckoned one of the ſafeſt. But, ſince obeſity is juſtly conſidered as a principal prediſpoſing cauſe, he inſiſts ſtrongly on the neceſſity of preventing an increaſe of fat by a vegetable diet, and uſing every other practicable method of augmenting the thinner ſecretions. Theſe were the only means which occurred to the Engliſh phyſicians of oppoſing this formidable diſeaſe.—In my own practice I have never known the Solar Tincture to fail in removing by degrees this dangerous diſorder. The caſes indeed that have occurred to me have been very few; and my uniform practice has been to order a wine-glaſs of the Tincture, diluted with water, to be taken at going to bed; and, in thoſe where the diſorder had gained great aſcendency, I preſcribed a like quantity to be taken at getting up in the morning, at leaſt an hour before breakfaſt. This has always rendered the attacks leſs violent, and at laſt totally removed them. Two table-ſpoonfuls of the Tincture undiluted ſhould be adminiſtered, if poſſible, during the height of the paroxyſm, which will generally give immediate eaſe.

Dr. Smyth of Ireland has, we are told, diſcovered that the angina pectoris may be certainly cured by iſſues, of which Dr. Macbride gives the following inſtance:

"A. B. a tall well-made man; rather large than otherwiſe: of healthy parents, except that there had been a little gout in the family; temperate; being very attentive to the buſineſs of his trade, (that of a watch-maker,) led a life uncommonly ſedentary; had, from his boyhood upwards, been remarkably ſubject to alarming inflammations of his throat, which ſeized him at leaſt once in the courſe of the year; in all other reſpects well. In 1767, (then forty-eight years of age,) he was taken, without any evident cauſe, with a ſudden and very diſpiriting throbbing under the ſternum. It ſoon afterwards increaſed, and returned upon him every third or fourth week, accompanied with great anxiety, very laborious breathing, choaking, a ſenſation of fulneſs and diſtenſion in the head, bloated and flushed countenance, turgid and watery eyes, and a very irregular and unequal pulſe. The paroxyſm invaded him almoſt conſtantly while he was ſitting after dinner; now and then he was ſeized with it in the morning, when walking a little faſter than uſual; and was then obliged to reſt on any object at hand. Once or twice it came on in bed; but did not oblige

him to ſit up, as it was then attended with no great difficulty in breathing. In the afternoon-fits, his greateſt eaſe was from the ſupine poſture; in which he uſed to continue motionleſs for ſome hours, until, quite ſpent and worn out with anguiſh, he dropt into a ſlumber. In the intervals between theſe attacks, which at length grew ſo frequent as to return every fourth or fifth day, he was, to appearance, in perfect health. Thus matters continued for more than two years; and various antiſpaſmodic were ineffectually tried for his relief. In 1769, there ſupervened a very ſharp conſtrictory pain at the upper part of the ſternum, ſtretching equally on each ſide, attended with the former ſymptoms of anxiety, dyſpnœa, choaking, &c. and with an excruciating cramp, as he called it, that could be covered with a crown-piece, in each of his arms, between the elbow and the wriſt, exactly at the inſertion of the pronator teres; the reſt of the limb was quite free. The fits were ſometimes brought on, and always exaſperated, by any agitation of mind or body. He once attempted to ride on horſeback during the paroxyſm: but the experiment was near proving fatal to him. The difference of ſeaſon or weather made no impreſſion upon him. Still, in the intervals, his health was perfectly good; except that his eyes, which before his illneſs were remarkably ſtrong and clear, were now grown extremely tender; and that his ſight was much impaired. He had no flatulency of ſtomach, and his bowels were regular. In this ſituation, Feb. 22, 1770, he applied to me for aſſiſtance. I had ſeen, I believe, eight or ten of theſe frightful caſes before. Two of the patients dropped dead ſuddenly. They were men between forty and fifty years of age, and of a make ſomewhat fleſhy. The fate of the others I was not informed of; or, at leaſt, cannot now recollect. Having found the total inefficacy of bliſters and the whole claſs of nervous medicines in the treatment of this anomalous ſpaſm, I thought it right to attempt correcting or draining off the irritating fluid in the caſe now before us. To this purpoſe, I ordered a mixture of lime-water with a little of the compound juniper-water, and an alterative proportion of Huxham's antimonial wine: I put the patient on a plain, light, perſpirable, diet; and reſtrained him from all viſcid, flatulent, and acrimonious, articles. By purſuing this courſe, he was ſoon apparently mended; but, after he had perſiſted regularly in it for at leaſt two months, he kept for ſome time at a ſtand. I then ordered a large iſſue to be opened on each of his thighs. Only one was made. However, as ſoon as it began to diſcharge, he amended. The frequency and ſeverity of the fits abated conſiderably; and he continued improving gradually, until, at the end of eighteen months, he was reſtored to perfect health; which he has enjoyed, without the leaſt interruption, till now, except when he has been tempted (perhaps once in a twelvemonth) to tranſgreſs rules, by making a large meal on ſalted meat, or indulging himſelf in ale or rum-punch, each of which never failed to diſorder him from

the beginning of his illneſs: but on even theſe occaſions, he has felt no more than the ſlighteſt motion of his former ſufferings; inſomuch that he would deſpiſe the attack, if it did not appear to be of the ſame ſtock with his old complaint. No other cauſe has had the leaſt ill effect on him. Though rum was conſtantly hurtful, yet punch, made with a maceration of black currants in our vulgar corn-ſpirit, is a liquor that agrees remarkably well with him. He never took any medicine after the iſſue began to diſcharge; and I have directed that it ſhall be kept open as long as he lives. The inflammations of his throat have diſappeared for five years paſt; he has recovered the ſtrength and clearneſs of his ſight; and his health ſeems now to be entirely re-eſtabliſhed."

Dr. Macbride, in a letter to Dr. Duncan, publiſhed in the Edinburgh Medical Commentaries, gives the following additional obſervations on this diſeaſe:

"Within theſe few weeks I have, at the deſire of Dr. Smyth, viſited, three or four times, a very ingenious man who keeps an academy in this city, of about thirty-four years of age, who applied to the doctor for his advice in January laſt. I ſhall give you his ſymptoms as I had them from his own mouth, which appear to me to mark his caſe to be an angina pectoris, and as deplorable as any that I have read of. It was ſtrongly diſtinguiſhed by the exquiſite conſtrictory pain of the ſternum, extending to each of his arms as far as the inſertion of the deltoid muſcle, extreme anxiety, laborious breathing, ſtrangling, and violent palpitation of the heart, with a moſt irregular pulſe. The paroxyſms were ſo frequent, that he ſcarcely ever eſcaped a day, for ſix or ſeven years, without one. They were uſually excited by any agitation of mind or body, though ſlight. He had clear intervals of health between the fits. The diſtemper ſeems hereditary in him, as he ſays his father was affected in the ſame manner ſome years previous to his death. He has a ſtrong gouty taint, which never ſhowed itſelf in his limbs; and he has led a life of uncommon ſedentarineſs, from intenſe application to mathematical ſtudies, attention of mind, and paſſion, even from his boyiſh years. Theſe circumſtances may, perhaps, account for his having been taken with this diſeaſe at ſo early an age as ſeventeen. A large iſſue was immediately opened on each of his thighs. In a month afterwards he began to mend, and has gone on improving gradually. He can now run up ſtairs briſkly, as I ſaw him do no later than yeſterday, without hurt; can bear agitation of mind; and has no complaint, excepting a ſlight oppreſſion of the breaſt, under the ſternum, which he feels ſometimes in a morning, immediately after dreſſing himſelf, and which he thinks is brought on by the motion uſed in putting on his clothes; though, for a complete week preceding the day on which I ſaw him laſt, he told me that he had been entirely free from all uneaſineſs, and was exulting that he had not had ſuch an interval of eaſe for theſe laſt ſeven years. Dr. Smyth alſo ſhowed me, in his *adverſaria*, or note-book, the caſe of a gentleman who had been under his care

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in 1760, which he had forgotten when my book went to the preſs, but which he was reminded of the other day by a viſit from his patient. It was a genuine angina pectoris, brought on by a ſedentary life, and great vexation of mind, clearly marked by the exquiſite pain under the ſternum, that extended acutely to the upper extremities, particularly along the left arm, together with the other ſymptoms of dyſpnœa, anxiety, palpitation of the heart, &c. recited in the caſe above. The diſorder went off in 1762, by large ſpontaneous diſcharges from the piles, but returned upon him ſeverely in 1765. Iſſues in his thighs were then recommended to him, but not made. But, whether it was by the perſuaſion of ſome friend, or of his own accord, he went into a courſe of James's powder, in ſmall alterative doſes, combined with a little caſtor and aſafœtida. This he perſiſted in for about ſix weeks; in the mean while, he had large acrimonious gleetings from the ſcrotum, and a plentiful diſcharge of ichor from the anus. From this time he began to find his complaints grow leſs and leſs diſtreſſing, and he has now been totally free from them for ſix years paſt."

Of this ſhocking diſorder died that eminent ſurgeon, Mr. John Hunter. See Encyclopædia Londinenſis, vol. x. p. 482.

STRAITNESS OF THE ŒSOPHAGUS.

This diſtemper has been treated of only by Dr. Munckley, who reckons it one of the moſt deplorable diſeaſes of the human body. Its beginning is in general ſo ſlight as to be ſcarcely worth notice, the patients perceiving only a ſmall impediment to the ſwallowing of ſolid food: they uſually continue in this ſtate for many months; during which, all liquid foods, and even ſolids themſelves when cut ſmall and ſwallowed leiſurely, are got down without much difficulty; by degrees the evil increaſes, and the paſſage through the œſophagus becomes ſo narrow, that not the ſmalleſt ſolid whatever can paſs through it; but, after having been detained for ſome time at the part where the obſtacle is formed, is returned again with a hollow noiſe of a very peculiar kind, and with the appearance of convulſion. The ſeat of this malady is ſometimes near the top of the œſophagus, and at other times farther down, nearer the ſuperior orifice of the ſtomach. In this laſt caſe, the part of the alimentary tube which is above the obſtruction is frequently ſo dilated by the food which is detained in it as to be capable of containing a large quantity; and the kind of vomiting, by which it is again returned through the mouth, comes on ſooner or later after the attempt to ſwallow, in proportion to the nearneſs or remoteneſs of the part affected. In the laſt ſtage of this diſeaſe, not even liquids themſelves can be ſwallowed ſo as to paſs into the ſtomach, and the patient dies literally ſtarved to death. On the diſſection of ſuch as have died in this manner, the œſophagus is found to be conſiderably thickened; and in ſome ſo contracted within at the diſeaſed part, as ſcarcely to admit the paſſing of a common probe; in others, to adhere together in ſuch a manner

manner as entirely to close up the passage, and not to be separated without great difficulty. He comes next to show what he has found to be the most efficacious method of treating this disease, which, though not uncommon, yet in general has been considered as incurable. He claims not the merit of having discovered the method of cure, but hopes that some service may arise from publishing what his experience has confirmed to him; having first received the hint from another eminent physician. The only medicine, then, from the use of which he has ever found any service, is mercury; and in cases which are recent, and where the symptoms have not risen to any great height, small doses of mercury given every night, and prevented, by purgative medicines, from affecting the mouth, have accomplished the cure. But where the complaint has been of long standing, and the symptom has come on of the food's being returned through the mouth, a more powerful method of treatment becomes necessary. In this case he has never found any thing of the least avail in removing the symptoms but mercury, used in such a manner as to raise a gentle but constant spitting, and this method he has pursued with the happiest success. If this method be commenced before the complaint has gained too much ground upon the constitution, the case is not to be despaired of; and, of those who have come under his care in this state, by much the greater part have received considerable benefit from it, and many have been entirely cured. The complaint itself, he observes, is not very uncommon; but there is no instance, to his knowledge, recorded, of success from any other manner of treating it than that he has recommended.

OBSERVATIONS ON THE MEANS OF PRESERVING HEALTH.

I. RULES for the Management of VALETUDINARIANS.

That part of the medical system which lays down rules for the preservation of health and prevention of diseases, termed Hygeine, is not to be strictly understood as if it respected only those people who enjoy perfect health, and who are under no apprehensions of disease, for such seldom either desire or attend to medical advice; but should rather be considered as relating to valetudinarians, or to such as, though not actually sick, may yet have sufficient reason to fear that they will soon become so: hence it is that the rules must be applied to correct morbific dispositions, and to obviate the various things that are known to be the remote or possible causes of diseases. From the way in which the several temperaments are usually mentioned by systematic writers, it should seem as if they meant that every particular constitution must be referred to one or other of the four; but this is far from being reducible to practice, since by much the greater number of people have constitutions so indis-

tinctly marked, that it is hard to ſay to which of the temperaments they belong. When we actually meet with particular perſons who have evidently either, 1. Too much ſtrength and rigidity of fibre, and too much ſenſibility; 2. Too little ſtrength, and yet too much ſenſibility; 3. Too much ſtrength, and but little ſenſibility; or, 4. But little ſenſibility joined to weakneſs;—we ſhould look on ſuch perſons as more or leſs in the valetudinary ſtate, who require that theſe morbific diſpoſitions be particularly watched, leſt they fall into thoſe diſeaſes which are allied to the different temperaments.

People of the firſt-mentioned temperament being liable to ſuffer from continued fevers, eſpecially of the inflammatory ſpecies, their ſcheme of preſerving health ſhould conſiſt in temperate living, with reſpect both to diet and exerciſe; they ſhould ſtudiouſly avoid immoderate drinking, and be remarkably cautious leſt any of the natural diſcharges be checked. People of this habit bear evacuations well, eſpecially bleeding: they ought not, however, to loſe blood but when they really require to have the quantity leſſened; becauſe too much of this evacuation would be apt to reduce the conſtitution to the ſecond-mentioned temperament, wherein ſtrength is deficient, but ſenſibility redundant.

Perſons of the ſecond temperament are remarkably prone to ſuffer from painful and ſpaſmodic diſeaſes, and are eaſily ruffled; and thoſe of the ſofter ſex who have this delicacy of habit are very much diſpoſed to hyſterical complaints. The ſcheme here ſhould be, to ſtrengthen the ſolids by moderate exerciſe, cold bathing, the Peruvian bark, and chalybeate waters; particular attention ſhould conſtantly be had to the ſtate of the digeſtive organs, to prevent them from being overloaded with any ſpecies of ſaburra which might engender flatus, or irritate the ſenſible membranes of the ſtomach and inteſtines, from whence the diſorder would ſoon be communicated to the whole nervous ſyſtem. Perſons of this conſtitution ſhould never take any of the draſtic purges, nor ſtrong emetics; neither ſhould they loſe blood but in caſes of urgent neceſſity. But a principal ſhare of management, in theſe extremely-irritable conſtitutions, conſiſts in avoiding all ſudden changes of every ſort, eſpecially thoſe with reſpect to diet and clothing, and in keeping the mind as much as poſſible in a ſtate of tranquillity. Hence the great advantages which people of this frame derive from the uſe of medicinal waters drunk on the ſpot, becauſe of that freedom from care and ſerious buſineſs of every kind which generally obtains in all the places laid out for the reception of valetudinarians.

The third-mentioned temperament, where there is an exceſs of ſtrength and but little ſenſibility, does not ſeem remarkably prone to any diſtreſſing or dangerous ſpecies of diſeaſe; and therefore it can hardly be ſuppoſed that perſons ſo circumſtanced will either of themſelves think of any particular ſcheme of management, or

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have recourſe to the faculty for their inſtructions: ſuch conſtitutions, however, we may obſerve, bear all kinds of evacuations well, and ſometimes require them to prevent an over-fulneſs, which might end in an oppreſſion of the brain or ſome other organ of importance.

But the fourth temperament, where we have weakneſs joined to want of ſenſibility, is exceedingly apt to fall into tedious and dangerous diſeaſe, ariſing from a defect of abſorbent power in the proper ſets of veſſels, and from remiſſneſs of the circulation in general; whence corpulency, dropſy, jaundice, and different degrees of ſcorbutic affection. In order to prevent theſe, or any other ſpecies of accumulation and depravation of the animal fluids, the people of this conſtitution ſhould uſe a generous courſe of diet with briſk exerciſe, and be careful that none of the ſecretions be interrupted, nor any of the natural diſcharges ſuppreſſed. Theſe conſtitutions bear purging well, and often require it; as alſo the uſe of emetics, which are frequently found neceſſary to ſupply the place of exerciſe, by agitating the abdominal viſcera; and are of ſervice to prevent the ſtagnation of bile, or the accumulation of mucous humours, which hinder digeſtion, and clog the firſt paſſages. The free uſe of muſtard, horſe-radiſh, and the like ſort of ſtimulating dietetics, is ſerviceable in theſe torpid habits.

When the general maſs of fluids is accumulated beyond what is conducive to the perfection of health, there ariſes what the writers term a *plethora*, which may prove the ſource of different diſeaſes; and therefore, when this over-fulneſs begins to produce languor and oppreſſion, care ſhould be taken in time to reduce the body to a proper ſtandard, by abridging the food and increaſing the natural diſcharges, uſing more exerciſe, and indulging leſs in ſleep. But in oppoſite circumſtances, where the fluids have been exhauſted, we are to attempt the prevention of further waſte by the uſe of ſtrengthening ſtomachics, a nouriſhing diet, and indulgence from fatigue of body or mind. Vitiated fluids are to be conſidered as affected either with the different kinds of general acrimony, or as betraying ſigns of ſome of the ſpecies of morbific matter which give riſe to particular diſeaſes, ſuch as gout, rheumatiſm, calculus, ſcurvy, &c.

During the ſtate of infancy, we may ſometimes obſerve a remarkable acidity, which not only ſhows itſelf in the firſt paſſages, but alſo ſeems to contaminate the general maſs of fluids. As it takes its riſe, however, from weak bowels, our views, when we mean to prevent the ill conſequences, muſt be chiefly directed to ſtrengthen the digeſtive organs, as on their ſoundneſs the preparation of good chyle depends; and hence ſmall doſes of rhubarb and chalybeates (either the natural chalybeate waters mixed with milk, or the flores martiales in doſes of a few grains, according to

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the age of the child) are to be adminiſtered; and the diet is to be ſo regulated as not to add to this acid tendency: briſk exerciſe is likewiſe to be enjoined, with frictions on the ſtomach, belly, and lower extremities.

Where the fluids tend to the putreſcent ſtate, which ſhows itſelf by fetid breath, ſpongineſs and bleeding of the gums, a bloated look and livid countenance, the diet then ſhould be chiefly of freſh vegetables and ripe fruits, with wine in moderation, briſk exerciſe, and ſtrengthening bitters.

Where acrimony ſhows itſelf by itching eruptions, uncommon thirſt, and fluſhing heats, nothing will anſwer better than ſuch ſulphureous waters as the Harrowgate and Moffat in Britain, or the Lucan Swadlimbar in Ireland; at the ſame time uſing a courſe of diet that ſhall be neither acrid nor heating.

So far with reſpect to thoſe kinds of morbific matter which do not invariably produce a particular ſpecies of diſeaſe: but there are others of a ſpecific nature, ſome of which are generated in the body ſpontaneouſly, and ſeem to ariſe from error in diet, or other circumſtances of ill management with reſpect to the animal economy: and hence it is ſometimes poſſible, in ſome degree if not altogether, to prevent the ill conſequences. Thus, there are inſtances where returns of the gout have been prevented by adhering ſtrictly to a milk diet.

The rheumatiſm has alſo been ſometimes warded off by wearing a flannel ſhirt, or by uſing the cold bath without interruption.

Calculus may be retarded in its progreſs, and prevented from creating much diſtreſs, by the internal uſe of ſoap and lime-water, by ſoap-lees taken in milk or in veal-broth, or by the uſe of aerated alkaline water, which may perhaps be conſidered as being both more ſafe and more efficacious, and at the ſame time more pleaſant, than any of the other practices.

The ſcurvy may be prevented by warm clothing and perſeverance in briſk exerciſe, by drinking wine or cider; and eating freely of ſuch vegetable ſubſtances as can be had in thoſe ſituations where this diſeaſe is moſt apt to ſhow itſelf.

In conſtitutions where there is an hereditary diſpoſition to the ſcroſula, if early precautions be taken to ſtrengthen the ſolids by cold bathing, a nouriſhing courſe of diet, and moderate uſe of wine, the acrimony which riſes to the diſeaſe will probably be prevented from producing any very bad effects.

The other kinds of morbific matter, which are of a ſpecific nature, are received into the body by infection or contagion.

The infection of a putrid fever or dyſentery is beſt prevented by immediately taking an emetic on the firſt attacks of the ſickneſs or ſhivering; and, if that do not completely anſwer, let a large bliſter be applied between the ſhoulders: by this

method the nurſes and other attendants on the ſick in the naval hoſpitals have often been preſerved. As to other infectious morbific matter, we muſt refer to what has already been ſaid when treating of hydrophobia, poiſons, &c.

The ill effects which may ariſe from the different ſpecies of ſaburra, are to be obviated, in general, by the prudent adminiſtration of emetics, and carefully abſtaining from ſuch kinds of food as are known to cauſe the accumulation of noxious matters in the firſt paſſages.

Crude vegetables, milk, butter, and other oily ſubſtances, are to be avoided by perſons troubled with a ſourneſs in the ſtomach; briſk exerciſe, eſpecially riding, is to be uſed, and they are to refrain from fermented liquors: the common drink ſhould be pure water; or water with a very little of ſome ardent ſpirit, ſuch as rum or brandy. Seltzer and Vahls water are to be drunk medicinally; and aromatic bitters, infuſions, or tinctures, with the acid elixir of vitriol, from 10 to 20 drops, will be found ſerviceable, in order to ſtrengthen the fibres of the ſtomach, and promote the expulſion of its contents, thereby preventing the too haſty fermentation of the alimentary mixture. In order to procure immediate relief, magneſia alba, or creta præparata, will ſeldom fail; the magneſia, as well as the chalk, may be made into lozenges, with a little ſugar and mucilage; and in that form may be carried about and taken occaſionally by people afflicted with the acid ſaburra.

In conſtitutions where there is an exuberance or ſtagnation of bile, and a troubleſome bitterneſs in the mouth, it is neceſſary to keep the bowels always free by taking occaſionally ſmall doſes of pure aloes, oleum ricini, cream of tartar, ſome of the common purging ſalts, or the natural purging waters.

When there is a tendency to the empyreumatic and rancid ſaburra, people ſhould carefully avoid all the various kinds of thoſe oily and high-ſeaſoned things generally termed *made-diſhes*, and eat plain meat, without rich ſauces or much gravy; and in theſe caſes the moſt proper drink is pure water.

II. Rules for thoſe who enjoy perfect Health.

There can be no doubt that, in general, temperance is the true foundation of health; and yet the ancient phyſicians, as we may ſee in the rules laid down by Celſus, did not ſcruple to recommend indulgence now and then, and allowed people to exceed both in eating and drinking: but it is ſafer to proceed to exceſs in drink than in meat; and, if the debauch ſhould create any extraordinary or diſtreſſing degree of pain or ſickneſs, and a temporary fever ſhould enſue, there are two ways of ſhaking it off, either to lie in bed and encourage perſpiration, or to get on horſe-

back, and by briſk exerciſe reſtore the body to its natural ſtate. The choice of theſe two methods muſt always be determined by the peculiar circumſtances of the parties concerned, and from the experience which they may before have had, which agrees beſt with them.

If a perſon ſhould commit exceſs in eating, eſpecially of high-ſeaſoned things, with rich ſauces, a draught of cold water, acidulated with vitriolic acid, will take off the ſenſe of weight at the ſtomach, and aſſiſt digeſtion, by moderating and keeping within bounds the alimentary fementation, and thus preventing the generation of too much flatus. The luxury of ices may be here of real ſervice at the tables of the great, as producing ſimilar effects with the cold water acidulated. Perſons in theſe circumſtances ought not to lay themſelves down to ſleep, but ſhould keep up and exercife until they are ſenſible that the ſtomach is unloaded, and that they no longer feel any oppreſſive weight about the præcordia.

If a man be obliged to faſt, he ought, if poſſible, during that time, to avoid laborious work: after ſuffering ſevere hunger, people ought not at once to gorge and fill themſelves; nor is it proper, after being over-filled, to enjoin an abſolute faſt: neither is it ſafe to reſt totally immediately after exceſſive labour, nor ſuddenly fall hard to work after having been long without motion: in a word, *all changes ſhould be made by gentle degrees;* for, though the conſtitution of the human body be ſuch that it can bear many alterations and irregularities without much danger, yet, when the tranſitions are extremely ſudden, they cannot fail of producing ſome kind or degree of diſorder.

It is alſo the advice of Celſus to vary the ſcenes of life, and not confine ourſelves to any ſettled rules: but as inaction renders the body weak and liſtleſs, and exerciſe gives vigour and ſtrength, people ſhould never long omit riding, walking, or going abroad in a carriage; fencing, playing at tennis, dancing, or other ſimilar engagements, which afford both exercife and amuſement, as each ſhall be found moſt agreeable or convenient, are to be uſed in their turns, according to the circumſtances and tendency to any particular ſpecies of diſeaſe. But, when the weakneſs of old age ſhall have rendered the body incapable of all theſe, then dry frictions with the fleſh-bruſh will be extremely requiſite to preſerve health, by accelerating the flow of humours through the ſmalleſt orders of veſſels, and preventing the fluids from ſtagnating too long in the cellular interſtices of the fleſhy parts.

Sleep is the great reſtorer of ſtrength; for, during this time, the nutritious particles appear to be chiefly applied to repair the waſte, and replace thoſe that have been abraded and waſhed off by the labour and exercife of the day. But too much indulgence in ſleep has many inconveniences, both with reſpect to body and mind, as it blunts the ſenſes, and encourages the fluids to ſtagnate in the cellular membrane;

brane; whence corpulency, and its necessary conſequences, languor and weakneſs. The proper time for ſleep is the night ſeaſon, when darkneſs and ſilence naturally bring it on: therefore day-ſleep, in general, is not ſo refreſhing; and to ſome people is really diſtreſsful, as creating an unuſual giddineſs and languor, eſpecially in perſons addicted to literary purſuits. Cuſtom, however, frequently renders ſleep in the day neceſſary; and in thoſe conſtitutions where it is found to give real refreſhment it ought to be indulged.

With regard to the general regimen of diet, it has always been held as a rule, that the ſofter and milder kinds of aliment are moſt proper for children and younger ſubjects; that grown perſons ſhould eat what is more ſubſtantial; and old people leſſen their quantity of ſolid food, and increaſe that of their drink.

Of FIXED AIR as a MEDICINE.

THE antiſeptic qualities of fixed air, or as it is now more generally called of the aerial or carbonic acid gas, have introduced it as a medicine in caſes of putrid diſorders, and various other complaints.—Dr. Percival obſerves, that, though fatal if inſpired in a very large quantity, it may in ſmaller quantities be breathed without danger or uneaſineſs. And it is a confirmation of this concluſion, that at Bath, where the waters copiouſly exhale this mineral ſpirit, the bathers inſpire it with impunity. At Buxton alſo, where the bath is in a cloſe vault, the effects of ſuch effluvia, if noxious, muſt certainly be perceived.

Encouraged by theſe and ſome other conſiderations, he adminiſtered fixed air in more than 30 caſes of the phthiſis pulmonalis, by directing his patients to inſpire the ſteams of an effervеſcing mixture of chalk and vinegar through the ſpout of a coffee-pot. The hectic fever has in ſeveral inſtances been conſiderably abated, and the matter expectorated has become leſs offenſive and better digeſted. He was not however, ſo fortunate in any one caſe as to effect a cure; although the uſe of this air was accompanied with proper internal medicines. But Dr. Withering was more ſucceſsful. One phthiſical patient under his care, by ſuch a courſe, entirely recovered; another was rendered much better; and a third, whoſe caſe was truly deplorable, ſeemed to be kept alive by it more than two months. It may be proper to obſerve, that fixed air can only be employed with any proſpect of ſucceſs in the latter ſtages of the phthiſis pulmonalis, when a purulent expectoration takes place. After the rupture and diſcharge of vomica alſo, ſuch a remedy promiſes to be a powerful palliative. Antiſeptic fumigations and vapours have been long employed, and much extolled, in caſes of this kind. The following experiment

ment was made to determine whether their efficacy in any degree depends on the ſeparation of fixed air from their ſubſtance.

One end of the bent tube was fixed in a phial full of lime-water; the other end in a bottle of the tincture of myrrh. The junctures were carefully luted; and the phial containing the tincture of myrrh was placed in water, heated almoſt to the boiling point, by the lamp of a tea-kettle. A number of air-bubbles were ſeparated, but probably not of the mephitic kind; for no precipitation enſued in the lime-water. This experiment was repeated with the *tinct. Tolutana Ph. Ed.* and with *ſp. vinoſ. camph.* and the reſult was entirely the ſame. The medicinal action therefore of the vapours raiſed from ſuch tinctures cannot be aſcribed to the extrication of fixed air, of which it is probable bodies are deprived by chemical ſolution as well as by mixture.

If mephitic air be thus capable of correcting purulent matter in the lungs, we may reaſonably infer it will be equally uſeful when applied externally to foul ulcers; and experience confirms the concluſion. Even the ſanies of a cancer, when the carrot-poultice failed, has been ſweetened by it, the pain mitigated, and a better digeſtion produced. But, though the progreſs of the cancer ſeems to be checked by the fixed air, it is to be feared a cure will not be effected. A palliative remedy, however, in a diſeaſe ſo deſperate and loathſome, may be conſidered as a very valuable acquiſition. Perhaps nitrous air might be ſtill more efficacious. This ſpecies of factitious air is obtained from all the metals, except zinc, by means of the nitrous acid; as a ſweetener and antiſeptic, it far ſurpaſſes fixed air.

In the ulcerous ſore throat, much advantage has been experienced from the vapours of effervеſcing mixtures drawn into the fauces. But this remedy ſhould not ſuperſede the uſe of other antiſeptic applications.

In malignant fevers, wines abounding with fixed air may be adminiſtered to check the ſeptic ferment, and ſweeten the putrid colluvies in the primæ viæ. If the laxative quality of ſuch liquors be thought an objection to the uſe of them, wines of a greater age may be given, impregnated with aerial acid.—The patient's common drink might alſo be medicated in the ſame way. A putrid diarrhœa frequently occurs in the latter ſtage of ſuch diſorders, and it is a moſt alarming and dangerous ſymptom. If the diſcharge be ſtopped by aſtringents, a putrid fomes is retained in the body, which aggravates the delirium, and increaſes the fever. On the contrary, if it be ſuffered to take its courſe, the ſtrength of the patient muſt ſoon be exhauſted, and death unavoidably enſue. The injection of mephitic air into the inteſtines, under theſe circumſtances, bids fair to be highly ſerviceable. And in ſome caſes of this kind, the gas emitted from a mixture of chalk and oil of vitriol, conveyed into the body by the machine employed for tobacco-clyſters, quickly reſtrained he

diarrhœa, corrected the heat and fetor of the ſtools, and in a ſhort time removed every ſymptom of danger.

As a ſolvent of the calculus, its virtues have been already mentioned; but the experiments made on that ſubject do not determine the matter with ſufficient accuracy.

Of MEDICAL ELECTRICITY.

THE application of this ſubtile fluid to medicinal purpoſes was thought of ſoon after the diſcovery of the electric ſhock; and, after various turns of reputation, its medical virtues ſeem now to be pretty well eſtabliſhed. Mr. Cavallo, who has publiſhed the lateſt and the beſt treatiſe on Medical Electricity, entirely diſapproves of giving violent ſhocks, and finds it moſt efficacious to expoſe the patient to the *electrical aura*, a gentle air, diſcharged from an iron or wooden point; or, if ſhocks are given, they ſhould be very ſlight, and not exceed twelve or fourteen at a time. In this way he recommends it as effectual in a great number of diſorders. The patient may be electrified from three to ten minutes: but, if ſparks are drawn, they ſhould not exceed the number of ſhocks above mentioned.

Rheumatic diſorders, even of long ſtanding, are relieved, and ſometimes quite cured, by only drawing the electric fluid with a wooden point from the part, or by drawing ſparks through flannel. The operation ſhould be continued for about four or five minutes, repeating it once or twice every day.

The gout, extraordinary as it may appear, has certainly been cured by means of electricity, in various inſtances. The pain has been generally mitigated, and ſometimes the diſeaſe has been removed ſo well as not to return again. In thoſe caſes, the electric fluid has been thrown by means of a wooden point, although ſometimes, when the pain was too great, a metal point only has been uſed.

Deafneſs, except when it is occaſioned by obliteration or other improper configuration of the parts, is either entirely or partly cured by drawing the ſparks from the ear with the glaſs-tube director, or by drawing the fluid with a wooden point. Sometimes it is not improper to ſend exceedingly-ſmall ſhocks (for inſtance, of one-thirteenth of an inch) from one ear to the other.—It has been conſtantly obſerved, that, whenever the ear is electrified, the diſcharge of the wax is conſiderably promoted.

The tooth-ach, occaſioned by cold, rheumatiſm, or inflammation, is generally relieved by drawing the electric fluid with a point, immediately from the part, and alſo externally from the face. But, when the body of the tooth is affected, electrization is of no uſe; for it ſeldom or never relieves the diſorder, and ſometimes increaſes the pain to a prodigious degree.

Inflammations of every ſort are generally relieved by a very gentle electrizati
In inflammations of the eyes, the throwing of the electric fluid by means of a wooden point is often attended with great benefit; the pain being quickly abated, and the inflammation being generally diſſipated in a few days. In theſe caſes, the eye of the patient muſt be kept open; and care ſhould be taken not to bring the wooden point very near it, for fear of cauſing any ſpark. Sometimes it is ſufficient to throw the fluid with a metal point; for in theſe caſes, too great irritation ſhould be always avoided. It is not neceſſary to continue this operation for three or four minutes without intermiſſion; but, after throwing the fluid for about half a minute, a ſhort time may be allowed to the patient to reſt and to wipe his tears, which generally flow very copiouſly: then the operation may be continued again for another half-minute, and ſo on for four or five times every day. The gutta ſerena has been ſometimes cured by electrization; but at the ſame time it muſt be confeſſed, it has proved ineffectual in many ſuch caſes, in which it was adminiſtered for a long time and with all poſſible attention. However, it has never been known that any body was made worſe by it. The beſt method of adminiſtering electricity in ſuch caſes, is firſt to draw the electric fluid with a wooden point for a ſhort time, and then to ſend about half a dozen of ſhocks of one-twentieth of an inch from the back and lower part of the head to the forehead, very little above the eye. A remarkable diſeaſe of the eye was ſome time ago perfectly cured by electrization; it was an opacity of the vitreous humour of the eyes. All the caſes of fiſtula lacrymalis, which Mr. Cavallo hath known to have been electrified by perſons of ability for a ſufficient time, have been entirely cured. The method generally practiſed has been that of drawing the fluid with a wooden point, and to take very ſmall ſparks from the part. The operation may be continued for about three or four minutes every day. It is remarkable, that in thoſe caſes, after curing the fiſtula lacrymalis, no other diſeaſe was occaſioned by it, as blindneſs, inflammations, &c. by ſuppreſſing that diſcharge.

Palſies are ſeldom perfectly cured by means of electricity, eſpecially when they are of long ſtanding; but they are generally relieved to a certain degree. The method of electrifying in thoſe caſes is to draw the fluid with the wooden point, and to bring ſparks through flannel, or through the uſual coverings of the part if they are not too thick. The operation may be continued for about five minutes per day.

Ulcers, or open ſores of every kind, even of a long ſtanding, are generally diſpoſed to heal by electrization. The general effects are a diminution of the inflammation, and at firſt a promotion of the diſcharge of properly-formed matter, which diſcharge gradually leſſens, according as the limits of the ſore contract, till it be quite cured. In theſe caſes the gentleſt electrization muſt be uſed, in order to avoid too great an irritation, which is generally hurtful. To draw or throw the fluid with

a wooden or even with a metal point, for three or four minutes per day, is fully ſufficient.

Cutaneous eruptions have been ſucceſsfully treated with electrization: but in theſe caſes it muſt be obſerved, that if the wooden point be kept too near the ſkin, ſo as to cauſe any conſiderable irritation, the eruption will be cauſed to ſpread more; but if the point be kept at about ſix inches diſtance, or farther, if the electrical machine be very powerful, the eruptions will be gradually diminiſhed, till they are quite cured. In this kind of diſeaſe, the immediate and general effect of the wooden point is to occaſion a warmth about the electrified part, which is always a ſign that the electrization is rightly adminiſtered.

The application of electricity has perfectly cured various caſes of St. Vitus's dance, or of that diſeaſe which is commonly called ſo; for it is the opinion of ſome very learned phyſicians, that the real diſeaſe called St. Vitus's dance, which formerly was more frequent than it is at preſent, is different from that which now goes under that name. In this diſeaſe, ſhocks of about one-tenth of an inch may be ſent through the body in various directions, and alſo ſparks may be taken. But, if this treatment prove very diſagreeable to the patient, then the ſhocks muſt be leſſened, and even omitted; inſtead of which, ſome other more gentle applications muſt be ſubſtituted.

Scrophulous tumours, when they are juſt beginning, are generally cured by drawing the electric fluid with a wooden or metal point from the part. This is one of thoſe kinds of diſeaſes in which the action of electricity requires particularly the aid of other medicines in order to effect a cure more eaſily; for ſcrophulous affections commonly accompany a great laxity of the habit, and a general cachexy, which muſt be obviated by proper remedies.

In cancers, the pains only are commonly alleviated by drawing the electric fluid with a wooden or metal point. Mr. Cavallo, however, mentions one caſe in which a moſt confirmed cancer of very long ſtanding, on the breaſt of a woman, had been much reduced in ſize. It is remarkable, that this patient was ſo far relieved by drawing the fluid with a metal point from the part, that the excruciating pains ſhe had ſuffered for many years did almoſt entirely diſappear; but, when the electric fluid was drawn by means of a wooden point, the pains rather increaſed.

Abſceſſes, when they are in their beginning, and in general whenever there is any tendency to form matter, are diſperſed by electrization. Lately, in a caſe in which matter was formed upon the hip, called the lumbar abſceſs, the diſeaſe was perfectly cured by means of electricity. The ſciatica has alſo been often cured by it. In all ſuch caſes, the electric fluid muſt be ſent through the part by means of two directors applied to oppoſite parts, and in immediate contact either with the ſkin, or with the coverings when theſe are very thin. It is very remarkable, that the mere

paſſage

paſſage of electric fluid in this manner is generally felt by the patients afflicted with thoſe diſorders nearly as much as a ſmall ſhock is felt by a perſon in good health. Sometimes a few ſhocks have been alſo given, but it ſeems more proper to omit them; becauſe ſometimes, inſtead of diſperſing, they rather accelerate the formation of matter.

In caſes of pulmonary inflammations, when they are in the beginning, electrization has been ſometimes beneficial; but in confirmed diſeaſes of the lungs it does not ſeem to have ever afforded any unqueſtionable benefit; however, it ſeems that in ſuch caſes the power of electricity has been but ſeldom tried.

Nervous head-achs, even of a long ſtanding, are generally cured by electrization. For this diſeaſe, the electric fluid muſt be thrown with a wooden and ſometimes even with a metal point, all round the head ſucceſſively. Sometimes exceedingly-ſmall ſhocks have been adminiſtered; but theſe can ſeldom be uſed, becauſe the nerves of perſons ſubject to this diſeaſe are ſo very irritable, that the ſhocks, the ſparks, and ſometimes even the throwing the electric fluid with a wooden point kept very near the head, throw them into convulſions.

The application of electricity has often been found beneficial in the dropſy when juſt beginning, or rather in the tendency to a dropſy; but it has never been of any uſe in advanced dropſies. In ſuch caſes, the electric fluid is ſent through the part, in various directions, by means of two directors, and ſparks are alſo drawn acroſs the flannel or the clothes; keeping the metal rod in contact with them, and ſhifting it continually from place to place. This operation ſhould be continued at leaſt ten minutes, and ſhould be repeated once or twice a-day.—Perhaps in thoſe caſes, a ſimple electrization (viz. to inſulate the patient, and to connect him with the prime conductor whilſt the machine is in action,) continued for a conſiderable time, as an hour or two, would be more beneficial.

Swellings in general, which do not contain any matter, are frequently cured by drawing the electric fluid with a wooden point. The operation ſhould be continued for three or four minutes every day.—It is very remarkable, that, in ſome caſes of white ſwellings quite cured by means of electricity, the bones and cartilages were in ſome meaſure diſfigured.

Agues have not unfrequently been cured by electricity, ſo that ſometimes one electrization or two have been ſufficient. The moſt effectual and ſure method has been that of drawing ſparks through flannel, or the clothes, for about ten minutes or a quarter of an hour. The patients may be electrified either at the time of the fit, or a ſhort while before the time in which it is expected.

The ſuppreſſion of the menſes, which is a diſeaſe of the female ſex that often occaſions the moſt diſagreeable and alarming ſymptoms, is often ſucceſsfully and ſpeedily

dily cured by means of electricity, even when the diſeaſe is of long ſtanding, and after the moſt powerful medicines uſed for it have proved ineffectual. The caſes of this ſort in which electrization has proved uſeleſs are ſo few, and the ſucceſsful ones ſo numerous, that the application of electricity for this diſeaſe may be juſtly conſidered as an efficacious and certain remedy. Great attention and knowledge is required, in order to diſtinguiſh the arreſt of the menſes from a ſtate of pregnancy. In the former, the application of electricity, as we obſerved above, is very beneficial; whereas, in the latter, it may be attended with very diſagreeable effects: it is therefore a matter of great importance to aſcertain the real cauſe of the diſeaſe, before the electricity be applied in thoſe caſes. Pregnant women may be electrified for other diſeaſes, but always uſing very gentle means, and directing the electric fluid through other parts of the body diſtant from thoſe ſubſervient to generation. In the real ſuppreſſion of the menſes, ſmall ſhocks, i. e. of about one twentieth of an inch, may be ſent through the pelvis; ſparks may be taken through the clothes from the parts adjacent to the ſeat of the diſeaſe; and alſo the electric fluid may be tranſmitted by applying the metallic or wooden extremities of two directors to the hips, in contact with the clothes; part of which may be removed in caſe they be too thick. Theſe various applications of electricity ſhould be regulated according to the conſtitution of the patient. The number of ſhocks may be about twelve or fourteen. The other applications may be continued for two or three minutes; repeating the operation every day. But either ſtrong ſhocks, or a ſtronger application of electricity than the patient can conveniently bear, ſhould be avoided; for by thoſe means ſometimes more than a ſufficient diſcharge is occaſioned, which is not eaſily cured. In caſes of uterine hæmorrhages, it is not known that the application of electricity was ever beneficial. Perhaps a very gentle electrization, ſo as to keep the patient inſulated and connected with the prime conductor whilſt the electrical machine is in action, may be of ſome benefit.

In reſpect to unnatural diſcharges and fluxes in general, it may be obſerved, that ſome diſcharges are quite unnatural or adventitious, as the fiſtula lacrymalis, and ſome ſpecies of the venereal diſeaſe; but others are only increaſed natural diſcharges, ſuch as the menſes, perſpiration, &c. Now the power of electricity in general has been found more beneficial for the firſt than for the ſecond ſort of diſcharges, which are moſtly increaſed by it.

In the venereal diſeaſe, electrization has been generally forbidden; having commonly increaſed the pains, and other ſymptoms, rather than diminiſhed them. Indeed, conſidering that any ſort of ſtimulus has been found hurtful to perſons afflicted with that diſorder, it is no wonder that electricity has produced ſome bad effects, eſpecially in the manner it was adminiſtered ſome time ago, viz. by giving ſtrong

ſhocks. However, it has been lately obſerved, that a very gentle application of electricity, as drawing the fluid by means of a wooden or metal point, is peculiarly beneficial in various caſes of this kind, even when the diſeaſe has been of long ſtanding. Having remarked above, that tumors, when juſt beginning, are diſperſed, and that unnatural diſcharges are gradually ſuppreſſed, by a judicious electrization, it is ſuperfluous to deſcribe particularly thoſe ſtates of the venereal diſeaſe in which electricity may be applied; it is only neceſſary to remind the operator to avoid any conſiderable ſtimulus in caſes of this ſort.

The application of electricity has been found alſo beneficial in other diſeaſes beſides thoſe mentioned above; but, as the facts are not ſufficiently numerous to afford the deduction of any general rules, we have not thought proper to take any particular notice of them.

We may laſtly obſerve, that, in many caſes, the help of other remedies to be preſcribed by the medical practitioner will be required to aſſiſt the action of electricity, which by itſelf would perhaps be uſeleſs; and, on the other hand, electrization may be often applied to aſſiſt the action of other remedies, as of ſudorifics, ſtrengthening medicines, &c.

Mr. Lichtenberg with a large electrophorus made ſome very curious experiments; in which, the knob of an electrified phial being drawn over the ſurface of the electric plate, finely-powdered roſin, afterwards ſifted upon the place, aſſumed the figure of ſtars and other beautiful ramifications, indicating not only an inclination to arrange itſelf in the ſame regular order with the cryſtals of ſalts, but to run out into branches like thoſe of vegetables. Theſe experiments have been repeated to great advantage by the Rev. Mr. Bennet, according to whoſe method the figures repreſented in the annexed Plate were made. The apparatus uſed for making them conſiſted only of a common Leyden phial, and a plate of glaſs 15 inches ſquare covered on one ſide with a varniſh of gum-lac diſſolved in ſpirit of wine, and ſeveral times laid over. Two ounces of ſhell-lac powdered and mixed with ſix ounces of ſpirit of wine anſwers very well for this purpoſe. The glaſs muſt be warmed, and the varniſh ſpread upon it with a camel's-hair pencil. Care muſt be taken, however, not to lay it on too thick, otherwiſe the effect will not follow.—The other ſide is covered with tin-foil laid on with common paſte. When it is to be uſed, the glaſs plate is put upon a metallic ſtand with the tin-foil ſide laid undermoſt; the phial is to be charged, and the knob drawn over the varniſhed ſide. Thus any kind of figure may be drawn, or letters made, as repreſented in the plate; and from every figure beautiful ramifications will proceed, longer or ſhorter according to the ſtrength of the charge. On ſome occaſions, however, the charge may be too ſtrong, particularly where we wiſh

Dodd delin. Pass Sculp.

Electrical Stars.

to repreſent letters, ſo that the whole will be blended into one confuſed maſs. The round figures are formed by placing metallic rings or plates upon the electrical plate, and then giving them a ſpark from the electrified bottle, or ſending a ſhock through them. The figures may be rendered permanent by blowing off the looſe chalk, and clapping on a piece of black ſized paper upon them; or, if they are wanted of another colour, that may eaſily be obtained by means of lake, vermilion, roſe-pink, or any of the ordinary colours ground very fine.

Electricity ſeems alſo to be the cauſe of cryſtallization; which probably is only an incipient or imperfect vegetation. Different ſalts aſſume different figures in cryſtallization, and are thus moſt eaſily diſtinguiſhed from one another. Each ſalt is capable of aſſuming a very different appearance of the cryſtalline kind, when only a ſingle drop of the ſaline ſolution is made uſe of, and the cryſtallization viewed through a microſcope. For our knowledge of this ſpecies of cryſtallization we are indebted to Mr. Henry Baker, who was preſented with a gold medal for the diſcovery, in the year 1744. Theſe microſcopical cryſtals he diſtinguiſhes from the large ones by the name of *configurations;* but this term ſeems inaccurate, and the diſtinction may well enough be preſerved by calling the large ones the common, and the ſmall ones the microſcopical, cryſtals of the ſalt. His method of making theſe obſervations he gives in the following words:

"I diſſolve the ſubject to be examined in no larger a quantity of rain or river water than I am certain it is ſufficient to ſaturate. If it is a body eaſily diſſolvable, I make uſe of cold water; otherwiſe I make the water warm, hot, or even boiling, according as I find it neceſſary. After it is perfectly diſſolved, I let it reſt for ſome hours, till, if overcharged, the redundant ſaline particles may be precipitated and ſettle to the bottom, or ſhoot into cryſtals; by which means I am moſt likely to have a ſolution of the ſame ſtrength at one time as at another; that is, a ſolution fully charged with as much as it can hold up, and no more; and by theſe precautions the configurations appear alike, how often ſoever tried: whereas, if the water be leſs ſaturated, the proportions at different times will be ſubject to more uncertainty; and, if examined before ſuch ſeparation and precipitation of the redundant ſalts, little more will be ſeen than a confuſed maſs of cryſtals. The ſolution being thus prepared, I take up a drop of it with a gooſe-quill cut in faſhion of a ſcoop, and place it on a flat ſlip of glaſs of about three quarters of an inch in width, and between three and four inches long, ſpreading it on the glaſs with the quill, in either a round or an oval figure, till it appears a quarter of an inch, or more, in diameter, and ſo ſhallow as to riſe very little above the ſurface of the glaſs. When it is ſo diſpoſed, I hold it as level as I can over the clear part of a fire that is not too fierce, or over the flame of a candle, at a diſtance proportionable to the heat it requires (which experience only

only can direct), and watch it very carefully till I diſcover the ſaline particles beginning to gather and look white, or of ſome other colour, at the extremities of the edges. Then (having adjuſted the microſcope before-hand for its reception, armed with the fourth glaſs, which is the fitteſt for moſt of thoſe experiments) I place it under my eye, and bring it exactly to the focus of the magnifier; and, after running over the whole drop, I fix my attention on that ſide where I obſerve any increaſe or puſhing forwards of cryſtalline matter from the circumference towards the centre. This motion is extremely ſlow at the beginning, unleſs the drop has been overheated, but quickens as the water evaporates; and in many kinds, towards the concluſion, produces configurations with a ſwiftneſs inconceivable, compoſed of an infinity of parts, which are adjuſted to each other with an elegance, regularity, and order, beyond what the exacteſt pencil in the world, guided by the ruler and compaſſes, can ever equal, or moſt luxuriant imagination fancy. When this action once begins, the eye cannot be taken off, even for a moment, without loſing ſomething worth obſervation: for the figures alter every inſtant till the whole proceſs is over; and, in many ſorts, after all ſeems at an end, new forms ariſe, different entirely from any that appeared before, and which probably are owing to ſome ſmall quantity of ſalt of another kind, which the other ſeparates from, and leaves to act after itſelf has done: and, in ſome ſubjects, three or four different ſorts are obſervable, few or none of them being ſimple and homogeneous. When the configurations are fully formed, and all the water evaporated, moſt kinds of them are ſoon deſtroyed again by the moiſture or action of the air upon them; their points and angles loſe their ſharpneſs, become uneven and defaced, and moulder, as it were, away. But ſome few are permanent, and, being incloſed between glaſſes, may be preſerved many months, or even years, entertaining objects for the microſcope. It happens oftentimes that a drop of ſaline ſolution can hardly be ſpread on the ſlip of glaſs, by reaſon of the glaſs's ſmoothneſs, but breaks into little globules, as it would do if the ſurface were greaſy: this was very troubleſome, till I found a way of preventing it, by rubbing the broken drop with my finger over the glaſs, ſo as to leave the ſurface ſmeared with it; on which ſmeared place, when dry, another drop of the ſolution may be ſpread very eaſily in what form one pleaſes. It likewiſe ſometimes happens, that, when a heated drop is placed properly enough for examination, the obſerver finds he can diſtinguiſh nothing: which is owing to ſaline ſteams that, riſing from the drop, cover and obſcure the object-glaſs, and therefore muſt immediately be wiped away with a ſoft cloth or leather. In all examinations by the microſcope of ſaline ſolutions, even through made in the day-time, I always employ the light of a candle, and adviſe every obſerver to do ſo likewiſe; for the configurations, being exceedingly tranſparent, are rendered much more diſtinguiſhable

Dodd del. Pass Sculp.

Crystals formed from Salts.

ble by the brown light a candle affords them by the more white and tranſparent day-light; and beſides, either by moving the candle or turning microſcope, ſuch light may be varied or directed juſt as the object requires."

In this manner were produced the beautiful cryſtallizations repreſented in the annexed Plate. They are vaſtly different from ſuch cryſtals of the ſame ſalts as are obtained by the common proceſſes; but Mr. Baker aſſures us they are no leſs conſtant and invariable than they, and that he has repeated the experiments a great number of times with the ſame ſucceſs.

Fig. 1. ſhows the microſcopical cryſtals of nitre or ſaltpetre. Theſe ſhoot from the edges, with very little heat, into flattiſh figures of various lengths, exceedingly tranſparent, and with ſtraight and parallel ſides. They are ſhown in their different degrees of progreſſion at the letters *a*, *b*, *c*, *d*, *e*; where *a* repreſents how they firſt begin. After numbers of theſe are formed, they will often diſſolve under the eye, and diſappear entirely; but, if you wait a little, new ſhoots will puſh out, and the proceſs go on afreſh. Theſe firſt figures ſometimes enlarge only with altering their ſhapes, and ſometimes form in ſuch ſort as the drop repreſents; but, if the heat has been too great, they ſhoot haſtily into ramifications very numerous and beautiful, but very difficult to be drawn; and which Mr. Baker therefore did not attempt. There ſeems all the while a violent agitation in the fluid, and moſt commonly, towards the concluſion, a few octaedra (compoſed of eight triangular planes, or two quadrangular pyramids, joined baſe to baſe) make their appearance.

2. Blue vitriol, the ſulphat of copper of the new chemiſtry, produces cryſtals round the edges, very ſhort at the beginning, but increaſing gradually, as repreſented at the figures 1, 2, 3, which denote their difference of form, and the progreſs of their growth. Theſe cryſtalline ſhoots are ſolid, regular, tranſparent, and reflect the light very beautifully from their poliſhed ſides and angles. As the watery part evaporates, numbers of long ſlender bodies like hairs are ſeen here and there, ſome lying ſide by ſide, or croſſing each other as at 4; others forming ſtar-like figures with many radiations (5, 5). This ſalt ſhoots but ſlowly, and therefore requires patience. At laſt, the true cryſtals begin to appear commonly in the middle of the drop, and very prettily branched.

3. Diſtilled verdigreaſe, or green oxyd of copper, diſſolved as above directed, and immediately applied to the microſcope, ſhows abundance of the regular figures, 1, 2, 3, 4, 5, 6, 7: but, if the ſolution is ſuffered to ſtand for a few hours, and a drop of it is then heated over the fire on a ſlip of a glaſs, till it begins to concrete about the ſides, and then examined, ſharp-pointed ſolid figures, biſected by a line cut through the middle, from which they are cut away towards the edges, begin to appear, and ſhooting forwards (1, 1, 1). Theſe figures are often ſtriated very

prettily from the middle line to the edges obliquely (2, 2); and frequently they ariſe in cluſters, and ſhooting from a centre (3, 3). Theſe figures are a long time in growing; and, whilſt they are doing ſo, regular cryſtals appear forming in ſeveral parts of the drop, of the moſt lively emerald colour, and reflecting the light from their ſides and angles, which are moſt exactly diſpoſed, and finely poliſhed. No cryſtals are formed in the middle till the water is nearly evaporated; and then they begin to form haſtily, for which reaſon they muſt be carefully attended. Their common figure reſembles too long $ſſ$ croſſing each other in an angle of about 60°, and ſhooting branches every way; each of which again protrudes other branches from one, and ſometimes from both, its ſides; making together an appearance like four leaves of fern conjoined by their ſtalks (5, 5). Separate cluſters of the ſame ſharp-pointed figures as thoſe at the edges of the drop are alſo formed in the middle of it. Sometimes alſo they put on another form, like the leaves of dandelion (7). Very beautiful figures are likewiſe produced by a kind of combination of ſharp-points and branches (8, 8). All the cryſtals are of a moſt beautiful green colour, but deeper or lighter according to the time of their production. The deepeſt are conſtantly produced firſt, and the paler ones afterwards. Towards the end of the proceſs ſome circular figures are formed, extremely thin, and ſo ſlightly tinged, with green lines radiating from a centre, as to be almoſt colourleſs (9). When all ſeems in a manner over, bundles of hair-like bodies appear frequently ſcattered here and there throughout the drop, like thoſe of blue vitriol already deſcribed.

4. Alum. The microſcopical cryſtals of this ſalt prove more or leſs perfect according to the ſtrength of the ſolution and the degree of heat employed in making the experiment. The ſolution of alum, however ſaturated with the ſalt, will not be found over-ſtrong after ſtanding ſome days: for in that time many cryſtals will have formed in it. This ſeparation will often leave the remainder too weak for the purpoſe; but, by holding the vial over or near the fire, the cryſtals will again diſſolve. After it has ſtood about half an hour, it may then be uſed. The drop put on the glaſs, and properly heated, exhibits commonly at firſt a dark cloud which appears in motion ſomewhere near the edge, and runs pretty ſwiftly both to the right and left, until it is either ſtopped by the intervention of regular cryſtals, or elſe it proceeds both ways at once, till, having ſurrounded the whole drop, the two ends ruſh together, and join into one (*a*, *a*). This cloudy part, which ſeems to be violently agitated while it is running round, appears on a ſtrict examination to conſiſt of ſalts, ſhot into long and very ſlender lines, much finer than the ſmalleſt hair, croſſing each other at right angles. As they go along, rows of ſolid cryſtals are produced from their internal edges. Theſe are compoſed of many oblique plain ſides (*b*, *b*), and which have all a tendency towards the figures of the regular cryſtals to be de-

ſcribed preſently. But it frequently happens, that, in ſome parts of the drop, many minute and circular figures are ſeen riſing at ſome little diſtances from the edge, which, enlarging themſelves continually, appear at laſt of a ſtar-like form. The cryſtals in the middle ſeldom appear till the fluid ſeems almoſt wholly evaporated; when, on a ſudden, many ſtraight lines appear puſhing forwards, whoſe ſides or edges are jagged, and from which other ſimilar ſtraight and jagged lines ſhoot out at right angles with the firſt. Theſe again have other ſmall ones of the ſame kind ſhooting out likewiſe from themſelves, and compoſe all together a moſt beautiful and elegant configuration (D). Each of theſe lines, increaſing in breadth towards its end, appears as if it were ſomewhat club-headed (*e*, *e*, *e*). Sometimes, inſtead of ſending branches from their ſides, many of theſe lines riſe parallel to each other, reſembling a kind of paliſado, and having numberleſs minute tranſverſe lines running between them (F). But the moſt wonderful part of all, though not producible without an exact degree of heat and right management, is the dark ground-work (G). It conſiſts of an infinity of parallel lines having others croſſing them at right angles, and producing a variety ſcarcely conceivable from lines diſpoſed in no other manner; the direction of the lines (which are exquiſitely ſtraight and delicate) being ſo frequently and differently changed, that one would think it the reſult of long ſtudy and contrivance. During the time this ground-work is framing, certain lucid points preſent themſelves to view moſt commonly on one ſide. Theſe grow continually larger, with radiations from a centre, and become ſtar-like figures as before mentioned. Some of them ſend out long tails, which give them the appearance of comets: and, at the end of all, a dark lineation in various directions darts frequently through, and occupies all or moſt of the ſpaces between them, making thereby no ill repreſentation, when viewed by candle-light, of a dark ſky illuminated with ſtars and comets. The regular cryſtals are often formed in the ſame drop with the others.

5. Borax. If a drop of ſolution of borax is held too long over the fire, it hardens on the ſlip of glaſs in ſuch a manner that no cryſtals can appear. The beſt method is to give it a briſk heat for about a ſecond, and then, applying it to the microſcope, the cryſtals will quickly form themſelves as repreſented in the figure.

6. Sal ammoniac, or muriat of ammoniac, begins with ſhooting from the edges great numbers of ſharp, but at the ſame time thick and broad, ſpiculæ; from whoſe ſides are protruded, as they riſe, many others of the ſame ſhape, but very ſhort, parallel to each other, but perpendicular to their main ſtem (I). Theſe ſpiculæ arrange themſelves in all directions, but for the moſt part obliquely to the plane from whence they riſe, and many are frequently ſeen parallel to one another (I, I). As they continue to puſh forwards, which they do without increaſing much in breadth, ſome ſhoot from

from them the ſmall ſpiculæ only (2); others divide in a ſingular manner by the ſplitting of the ſtem; others branch into ſmaller ramifications (4). Before the middle of the drop begins to ſhoot, ſeveral exceedingly minute bodies may be diſcernable at the bottom of the fluid. Theſe in a little while riſe to the top, and ſoon diſtinguiſh their ſhape as at (5). Their growth is very quick, and for ſome time pretty equal; but at laſt ſome branch gets the better of the reſt, and forms the figure (6). The other branches enlarge but little after this, all the attraction ſeeming to be lodged in that one that firſt began to lengthen; and from this more branches being protruded, and they again protruding others, the whole appears as at (8). It is not uncommon to ſee in the middle of the drop ſome cryſtals, where, inſtead of the ſtraight ſtems above deſcribed, there is formed a kind of zig-zag, with ſpiculæ like thoſe in the other figures (7).

7. Salt of lead, or ſaccharum ſaturni. A little of this ſalt diſſolved in hot water, which it immediately renders milky, after ſtanding a quarter of an hour to ſubſide, is in a fit condition for an examination by the microſcope. A drop of it then applied on a ſlip of glaſs, and held over the fire to put the particles in action, will be ſeen forming round the edge a pretty even and regular border of a clear and tranſparent film or gluy ſubſtance *(aaaa)*; which, if too ſudden and violent a heat be given, runs over the whole area of the drop, and hardens ſo on the glaſs as not to be got off without great difficulty. But, if a moderate warmth be made uſe of, which likewiſe muſt not be too long continued, this border proceeds only a little way into the drop, with a kind of radiated figure compoſed of fine lines, or rather bundles of lines, beginning from the centres to the interior edge of the border, and ſpreading out at nearly equal diſtances from each other every way, towards the exterior *(bbbb)*. From the ſame centres are produced afterward a radiation inwards, compoſed of parallelograms of different lengths and breadths; from one and ſometimes both the angles of theſe, are frequently ſeen ſhootings ſo exceedingly ſlender, that they are perhaps the beſt poſſible repreſentations of a mathematical line. The extremities of the parallelograms are generally caſt off at right angles, but they are ſometimes alſo ſeen oblique *(cccc)*. Centres with the like radii iſſuing from them, and ſome of the glutinous matter for their root, are ſometimes formed in the drop, entirely detached from the edges; and in theſe it is very frequent to find a kind of ſecondary radii proceeding from ſome of the primary ones; and others from them to a great number of gradations, forming thereby a very pretty figure (D).

8. Salt of tin produces at the edges of the drop a number of octaedra, partly tranſparent, ſtanding on long necks, at ſmall diſtances from each other, with angular ſhoots between them *(aa)*. At the ſame time ſolid and regular opaque cubes will be ſeen forming themſelves in other parts of the drop *(bb)*. In the middle of the ſame

ſame drop, and in ſeveral other parts of it, very different figures will alſo be formed; particularly great numbers of flat, thin, tranſparent, hexangular, bodies (*ccc*): ſome among which are thicker (*e*); and a few appear more ſolid, and with ſix ſloping ſides ariſing to a point, as if cut and poliſhed (*d*). The figure (*f*) is compoſed of two high pyramids united at their baſe. Some in this kind of form are found truncated at one of their ends, and others at both. Several of the hexagonal bodies may be obſerved with ſloping ſides, forming a ſmooth triangular riſing plane, whoſe angles point to three intermediate ſides of the hexagon (*g*).

9. Epſom ſalt (ſulphat of magneſia) begins to ſhoot from the edge in jagged figures (*a*). From other parts differently-figured cryſtals extend themſelves towards the middle, ſome of which have fine lines proceeding from both ſides of a main ſtem, in an oblique direction; thoſe on one ſide ſhooting upwards in an angle of about 60°, and thoſe on the other downwards in the ſame obliquity (*f*). Others produce jags from either ſide nearly perpendicular to the main ſtem, thereby forming figures that reſemble ſome ſpecies of the polypody (*c*); but in others the jags are ſhorter (*d*). Now and then one of the main ſtems continues ſhooting to a conſiderable length, without any branchings from the ſides: but at laſt ſends out two branches from its extremity (*g*). Sometimes a figure is produced having many fine and minute lines radiating from a centre (*h*). The laſt ſhootings in the middle of the drop (*h*) are not unlike the frame-work for the flooring or roofing of a houſe, but with the angles oblique: and ſometimes a form of another kind preſents itſelf (*i*).

10. Scarborough ſalt begins to ſhoot from the edges: firſt of all in portions of quadrilateral figures, much reſembling thoſe of common ſalt; but two of their angles, inſtead of 90, are about 100°. They ſhoot in great numbers round the borders of the drop, having their ſides as nearly parallel to one another as the figure of the drop will allow: ſome proceed but a little way, others farther, before they renew the ſhoot (*aa*). In ſome places they appear more pointed and longer (*b*); and ſometimes, inſtead of the diagonal, one of the ſides is ſeen towards the edge, and the other ſhooting into the middle (*c*). The middle cryſtals (*def*) ſeem to be of the vitriolic kind.

11. Glauber's ſalt, or ſulphat of ſoda, produces ramifications from the ſide of the drop, like the growth of minute plants, but extremely tranſparent and elegant (*c*). Some of them, however, begin to ſhoot from a centre at ſome diſtance from the edge, and protrude branches from that centre in a contrary direction (*b*). Sometimes they ſhoot from one and ſometimes from more ſides of the central point in different varieties (*d*). Other figures are produced from different parts of the edge of the drop (*a, f, e*); but the moſt remarkable and beautiful cryſtallization forms laſt of all near the middle of the drop. It is compoſed of a number of lines proceeding from

one another at right angles, with tranſparent ſpaces and diviſions running between them, appearing altogether like ſtreets, alleys, and ſquares *(g g)*. When this cryſtallization begins, it forms with great rapidity, affording the obſerver a very agreeable entertainment: but its beauty is of very ſhort duration; in a few moments it diſſolves and vaniſhes like melted ice, which renders drawing it very difficult.

12. Salt of Jeſuits bark. The few ſhootings which this ſalt produces at the edge of the drop are of no regular figure *(a)*. The whole area becomes quickly filled with great numbers of rhombi, of different ſizes, extremely thin and tranſparent *(b)*. Some of theſe enlarge greatly, and acquire a conſiderable thickneſs, forming themſelves into ſolids of many ſides *(c c)*. Near the concluſion ſome cryſtals of ſea-ſalt are formed *(d d)*, and likewiſe a few odd triangular figures *(e)*.

13. Salt of liquorice begins ſhooting from the edge with a ſort of rhombic ſpiculæ *(a)*. Some four-branched figures like thoſe of vitriol commonly appear, but moulder away before their ramifications are completed, leaving only their ſtamina behind *(b b)*. The middle of the drop is uſually overſpread with great numbers of parallelograms, ſome exceedingly tranſparent, being mere planes; having ſometimes one, ſometimes more, of the angles canted in ſuch a manner as to produce pentagonal, hexagonal, and other, figures. Others have much thickneſs, and form parallelopipeds or priſms *(c)*. Some of the plane figures now and then protrude an irregular kind of ſhooting which appears very pretty *(d)*.

14. Salt of wormwood, or carbonat of potaſh. The firſt ſhootings of this ſalt from the edges of the drop appear of a conſiderable thickneſs in proportion to their length: their ſides are deeply and ſharply jagged or indented, being made up of many ſomewhat-obtuſe angles, and their ends point with angles of the ſame kind *(a)*. But other ſhoots frequently branch out from theſe original ones, and they again ſend forth others, making all together a very pretty appearance *(bb)*. The cryſtals of this ſalt are very different from each other, conſiſting of ſquares, rhombi, parallelograms, &c. *(c)*.

15. Salt of tobacco. If a moderate degree of heat be given to a ſolution of this ſalt, its firſt ſhootings will be from the edges of the drop, in ſlender tapering figures, ending with very ſharp points, but at conſiderable diſtances from one another. Along with theſe are formed other cryſtals, nearly of the ſame kind, but entirely detached, and farther within the drop, having the thicker ends towards the centre of the drop, and the ſharp points turned towards its edge *(a)*. When a little more heat has been given, other ſpiculæ are produced from the edge, whoſe ends ſpread on either ſide, and then terminate in a point, and which have all along their ſides triangular pointed cryſtals, placed alternately, ſo as to repreſent a zig-zag with a line drawn through its middle *(b)*. The regular cryſtals are produced in the middle of the drop, and are either hexagons or rhombi *(c)*. When the moiſture is nearly exha-

led, there are ſometimes ſeen to ſhoot from, or rather under, the ſpiculæ, upon the plane of the glaſs, a repreſentation of leaves, very ſmall at their firſt appearance, but gradually increaſing (*d*). A violent agitation may be diſcovered in the fluid by the firſt magnifier during the whole proceſs, but eſpecially at the beginning, and extremely minute cryſtals ariſing from the bottom.

16. Salt of hartſhorn. On the application of a very ſmall degree of heat, ſalt of hartſhorn ſhoots near the edges of the drop into ſolid figures ſomewhat reſembling razors or lancets, where the blade turns into the handle by a claſp (*d*). The cryſtals of this ſalt are produced with great velocity, and are ſomewhat opaque, ſhooting from the edges of the drop, on both ſides of a main ſtem, and with a kind of regularity, rugged branches like thoſe of ſome ſorts of coral (*a a*). But ſometimes, inſtead of theſe branches, ſharp ſpiculæ, ſome plain, and others jagged, are protruded to a conſiderable depth on one ſide only (*b*). As the fluid exhales, ſome one of the branching figures generally extends to a great length, producing on one ſide ſhoots that are rugged and irregular, and on the other curious regular branches reſembling thoſe of ſome plant (*c*).

17. Salt of urine ſhoots from the edges of the drop in long parallelograms like nitre (*aa*). But in other places, along the ſides of the drop ſolid angles are formed, that ſeem to be the rudiments of common ſalt (*b*). Some of the parallelograms increaſe much in ſize, and ſpread themſelves in the middle, ſo as to change their firſt figure, and become three or four times bigger than the reſt; and theſe have a dividing line that runs through their whole length from end to end, whence iſſue other ſhort lines at ſmall diſtances, oppoſite to one another, all pointing with the ſame degree of obliquity towards the baſe (*cc*). Among theſe enlarged figures ſome few ſhoot ſtill forward and tapering towards a point, but, before they form one, ſwell again, and begin as it were anew; and thus they proceed ſeveral times before their figure is quite finiſhed (*aa*). The figures 1, 2, 3, 4, 5, 6, are the regular cryſtals of this ſalt when it is allowed to diſſolve in the air, and no heat at all is given.

18. Rheum, or the clear liquor which diſtils from the noſtrils when people catch cold, is ſtrongly ſaturated with ſalt. A drop of it on a ſlip of glaſs will ſoon cryſtallize in a beautiful manner, either with or without heat; but if heated to about the warmth of the blood, and then viewed through the microſcope, many lucid points will be ſeen riſing and increaſing gradually, till their form is ſhown to be quadrangular, with two tranſparent diagonals croſſing each other (*d d*). Theſe diagonals ſhoot ſoon after far beyond the ſquare, protruding other lines at right angles from their ſides; and thus they go on to form the moſt elegant and beautiful cryſtals (*bb, cc*). When a drop of rheum is ſet to cryſtallize without any heat, inſtead of branched cryſtals over the whole area, ſuch are formed only in the middle; but,

about

about the edges, plant-like figures are produced, ſhooting ſeveral ſtems from one point, and reſembling a kind of moſs (E).

19. Camphor, though inſoluble in water, diſſolves very readily in ſpirit of wine. A drop of this ſolution ſpread upon a ſlip of glaſs cryſtallizes inſtantly in the beautiful manner repreſented in the figure.

20. Manna eaſily diſſolves in water, and a drop of the ſolution is a very pretty object. Its firſt ſhootings are radiations from points at the very edge of the drop: the radiating lines ſeem opaque, but are very ſlender (*a a a*). Amongſt theſe ariſe many minute tranſparent columns, whoſe ends grow wider gradually as they extend in length, and terminate at laſt with ſome degree of obliquity (*b*). Some few figures, radiating from a centre every way, and circumſcribed by an outline, are produced within the drop (*d d*). But the moſt ſurpriſing and elegant configuration is compoſed of many cluſters of radiations ſhooting one from another over great part of the drop, and making all together a figure not unlike a beautiful ſea-plant.

Of ANIMAL MAGNETISM

ANIMAL MAGNETISM is a ſympathy which exiſts between the magnet and the inſenſible perſpiration of the human body, whereby an æther, or univerſal effluvia, is made to paſs and repaſs through the pores of the cuticle, in the ſame manner as the electrical fluid paſſes through bodies; and by which many cures are performed.

The ſyſtem originated, in 1774, from a German philoſopher named Father Hehl, who greatly recommended the uſe of the magnet in medicine. M. Meſmer, a phyſician of the ſame country, by adopting the principles of Hehl, became the direct founder of the ſyſtem. He had already diſtinguiſhed himſelf by a Diſſertation on the Influence of the Stars upon the human Body, which he publicly defended in a theſis before the univerſity of Vienna. He afterwards made a tour through Germany, publiſhing every-where the great cures he performed by means of animal magnetiſm; and arrived at Paris in the beginning of the year 1778. Here he was firſt patroniſed by the author of the Dictionnaire des Merveilles de la Nature; in which work a great number of his cures were publiſhed, Meſmer himſelf receiving likewiſe an ample teſtimony of his candour and ſolid reaſoning. Our phyſician ſoon collected ſome patients; and in the month of April 1778 retired to Creteil, from whence he in a ſhort time returned with them perfectly cured. His ſucceſs was now great; and patients increaſed ſo rapidly, that the doctor was ſoon obliged to take pupils to aſſiſt him in his operatons. Theſe pupils ſucceeded equally well as Meſmer himſelf; and ſo great was their emolument, that one of them, named Deſlon, realized upwards of 100,000l. ſterling. In 1779 Meſmer publiſhed a memoir

moir on the ſubject of Animal Magnetiſm, promiſing afterwards a complete work upon the ſame, which ſhould make as great a revolution in philoſophy as it had already done in medicine.

The new ſyſtem gained ground daily; and ſoon became ſo faſhionable, that the jealouſy of the faculty was thoroughly awakened, and an application concerning it was made to the French government. In conſequence of this, a committee was appointed to inquire into the matter, conſiſting partly of phyſicians and partly of members of the Royal Academy of Sciences at Paris, with Dr. Franklin at their head. Meſmer himſelf refuſed to have any communication with the committee: but his moſt celebrated pupil Deſlon was leſs ſcrupulous, and explained the principles of his art in the following manner.

1. Animal magnetiſm is an univerſal fluid, conſtituting an abſolute plenum in nature, and the medium of all mutual influence between the celeſtial bodies, and between the earth and animal bodies. 2. It is the moſt ſubtile fluid in nature; capable of a flux and reflux, and of receiving, propagating, and continuing, all kinds of motion. 3. The animal body is ſubjected to the influences of this fluid by means of the nerves, which are immediately affected by it. 4. The human body has poles and other properties analogous to the magnet. 5. The action and virtue of animal magnetiſm may be communicated from one body to another, whether animate or inanimate. 6. It operates at a great diſtance, without the intervention of any body. 7. It is increaſed and reflected by mirrors; communicated, and propagated, and increaſed, by ſound; and may be accumulated, concentrated, and tranſported. 8. Notwithſtanding the univerſality of this fluid, all animal bodies are not equally affected by it; on the other hand, there are ſome, though but few in number, the preſence of which deſtroys all the effects of animal magnetiſm. 9. By means of this fluid, nervous diſorders are cured immediately, and others mediately; and its virtues, in ſhort, extend to the univerſal preſervation of mankind.

From this theory, M. Deſlon engaged, 1. To prove to the commiſſioners, that ſuch a thing as animal magnetiſm exiſted; 2. To prove the utility of it in the cure of diſeaſes; and to communicate to them all that he knew upon the ſubject. The commiſſioners accordingly attended in the room where the patients underwent the magnetical operations. The apparatus conſiſted of a circular platform made of oak, and raiſed about a foot and a half from the ground. At the top of it were a number of holes, in which were iron rods with moveable joints for the purpoſe of applying them to any part of the body. The patients were placed in a circle round it, each touching an iron rod, which he could apply to any part of the body at pleaſure; they were joined to one another by a cord paſſing round their bodies, the deſign being to increaſe the effect by communication. In one corner of the room was a piano-

forte, on which ſome airs are played, occaſionally accompanied with a ſong. Each of the patients held in his hand an iron rod ten or twelve feet long; the intention of which was to concentrate the magnetiſm in its point, and thus to render its effects more ſenſible. Sound is another conductor of this magnetiſm; and, in order to communicate the magnetiſm to the piano-forte, nothing more is neceſſary than to bring the iron rod near it. Some magnetiſm is alſo furniſhed by the perſon who plays it; and this magnetiſm is tranſmitted to the patients by the ſounds. The internal part of the platform was ſo contrived as to concentrate the magnetiſm, and was the reſervoir whence the virtue diffuſed itſelf among the patients.

Beſides the different ways of receiving the magnetiſm already mentioned, viz. by the iron, cord, and piano-forte, the patients alſo had it directly from the doctor's finger, and a rod which he held in his hand, and which he carried about the face, head, or ſuch parts of the patient as were diſeaſed; obſerving always the direction of the poles. His principal application of magnetiſm, however, was by preſſure of the hands or fingers on the hypochondria, or lower region of the ſtomach.

The effects of theſe operations upon Deſlon's patients were very amazing. Some ſpit, coughed, and ſweat, and felt extraordinary heats in different parts of the body. Many had convulſions, which is what is called their criſis, &c.—The commiſſioners after this determined to try the experiments themſelves; for the fluid was totally imperceptible by any of the ſenſes, and they could only aſcertain its exiſtence by its ultimately curing diſeaſes, or by its obſervable effects upon the human body.

The practice having been ſince purſued in England with great ſucceſs by the ingenious Dr. Bell, I ſhall give the proceſs and effects of this diſcovery in his own words.

"There is an univerſal fluid which fills all ſpace. Every body is endowed with a certain quantity of electric fluid. There exiſts an attraction and repulſion, or ſympathy and antipathy, between animated bodies. The univerſal currents of the univerſal fluid, are the cauſe and exiſtence of bodies. One may accelerate thoſe currents in a body, and produce criſis and ſomnambuliſm, which is done by acting reciprocally upon one another, by increaſing the currents going acroſs their interſtices or pores, in conſequence of the abſolute will of the operator. As there exiſts a general and reciprocal gravitation of all celeſtial bodies towards each other, ſo there exiſts a particular and reciprocal gravitation of the conſtitutive parts of the earth towards the whole, and of that whole towards each of its parts.

"The reciprocal action of all theſe bodies is operated upon by the inſenſible perſpiration, or vapour, flowing in and out, as you ſee in a real loadſtone or in an artificial magnet, forming an outſide atmoſphere; it alſo produces currents in a more or leſs direct manner, according to the analogy of bodies. That which

can act moſt effectually on a ſickly man, is one who is in a good ſtate of health, and is of a ſimilar conſtitution—the power of man in a good ſtate of health will be then more powerful in conſequence of the latter's weakneſs, who receives more than he gives; it will increaſe the circulation, and produce beneficial effects.

"The reſpective poſition of two beings acting on one another is not indifferent. To judge what that poſition ſhould be, we ought to conſider each being as a whole compounded of different parts, of which each poſſeſſes a form, or particular tonical movement. It is of courſe by that means eaſily underſtood, that two beings have over each other the greateſt influence poſſible, when they are ſo placed that their analogous parts act on one another in the moſt harmonical manner. It is neceſſary that the perſon who ſubmits to be treated is willing, as well as that the operator's mind muſt be abſolute, and think of nothing but of the different ſenſations he then feels. *Credite & volete.* (This is the ſecret.)

"Therefore, in order that two perſons may act on each other in the ſtrongeſt manner poſſible, they muſt be placed oppoſite each other; from North to South is the beſt; you turn your patient's face towards the South; you may treat in other directions, according to your ideas and circumſtances. In that oppoſite poſition your atmoſpheres are joining; and you may be conſidered as forming but one whole, acting in an harmonic manner. When a man ſuffers, all the action of life is directed towards him in order to deſtroy the cauſe of ſuffering; likewiſe, when two perſons are acting on each other, the whole action of that union acts on the diſordered parts with a force proportioned to the increaſe of the maſs. It may therefore be in general aſſerted, that the action of animal electricity and Magnetiſm, &c. increaſes in proportion to the maſſes.

"It is poſſible to direct the action of Animal Electricity and Magnetiſm more particularly on any individual part, by fixing your idea and directing the fluid upon the part affected. Our arms may be conſidered as conductors to the animal fluid, and ſerve to attract or repel according to our will, and eſtabliſh a kind of continuity between bodies. It follows, from what has been ſaid on the moſt advantageous poſition of two beings acting on each other in order to maintain the harmony of the whole, one ought to touch the right part with the left arm, and the right foot in contact with the left. In that poſition you are in affinity with your patient, your two atmoſpheres are joined; it ſhows the oppoſition of poles in the human body, and is nearly the ſame as thoſe which may be obſerved in the loadſtone, or artificial magnet.

"Paracelſus, as well as many other anatomiſts, have admitted poles in man. Mr. George Adams, in his Treatiſe on Magnetiſm, juſtly ſays, 'In ſome future period it may be diſcovered that moſt bodies are poſſeſſed of a polarity, as well as one direction.

direction relative to the various affinity of the elements of which they are compounded. The better to conceive the poles of the human body, we ought to conſider man divided into two parts, by a line drawn from the top to the pubis; all the joints of the left part may be conſidered as poles oppoſite to thoſe correſponding herewith; the fluid paſſes out more ſenſibly, and in a greater abundance, from the extremities, as thoſe extremities are conſidered as poles oppoſite to the right, and are the beſt conductors of the animal fluid.

"You may give polarity to animate and inanimate bodies; that is to ſay, to increaſe an action to a degree which they had not before, only by a friction very nearly reſembling that which you give to a piece of ſteel before it becomes a magnet, except that it will not be ſo palpable. You may alſo change the poles in the human body pretty nearly the ſame as you change thoſe of a magnet. You may alſo ſtrengthen or increaſe the action of Animal Electricity and Magnetiſm by animate and inanimate bodies, as you may increaſe the action of an artificial magnet by adding more magnets, provided the poles are contrary: therefore every thing is filled in the univerſe by means of an univerſal fluid in which all bodies are immerſed, and therefore all beings touch one another in conſequence of the continual circulation by which the currents of the magnetic fluid flow out and paſs in; and in conſequence of this you may affect a perſon at a diſtance, provided he is of a weak habit of body, and has been in a criſis before you put the column of air into vibration which exiſts between the perſon you treat and yourſelf; that will affect him, as is ſeen or felt by the force of ſounds at a concert.

"In order to be in affinity or harmony with your patient, you muſt touch him by the hand; as there is a circulation which forms itſelf between you and him, and tends to an equilibrium, it is generally by that means eaſier to take your patients out of their criſis. You next hold up both your hands parallel to the head, and bring them gently down as far as the pubis; you may follow the direction of the nerves; then fix your hands upon the diaphragm or ſtomach, where lies the greateſt abundance of nerves; you may put your thumbs upon the plexus, and put the nerves in motion; you may alſo fix one hand upon the ſtomach, and draw the other towards you; by that mean yoattract or repel at pleaſure.—There are various ways of manipulation, which the operator makes uſe of, according to circumſtances. If you wiſh to procure ſleep ſoon, change your poſition; get either to the right ſide of your patient or left; in that poſition you fix one of your hands before the head, and the other behind; keep them there with all your might, till you feel ſome heat in the palm of the hand. If the perſon is not inclined to ſleep, you muſt charge the head in different directions, by ſhutting your hands as if you were boxing—then you open them quick, and this you repeat often; the perſon feels then a drowſineſs.—You muſt

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ANIMAL MAGNETISM.—The Operator putting his Patient into a Crisis.

muſt keep your hands in oppoſition as before; by theſe means the animal fluid gets into the abſorbent veſſels—acts alſo upon the nerves, which ſtimulates the body and produces a criſis. If you ſee the patient too much agitated, get oppoſite to him, and bring both your hands downwards from head to foot, or as if you were to fan a perſon, and, getting backwards, it will compoſe him.—Then you ſeek for the cauſe and place of the illneſs; or you hold the perſon's hand, and you aſk him where he feels pain, as it is increaſed by treating: if he does not anſwer your queſtions properly, it is a ſign he is not in a perfect ſtate of ſomnambuliſm; you muſt keep him aſleep longer without ſpeaking to him.—You then ſeek for the ſeat of the diſeaſe, by extending your hand at a little diſtance from his body, beginning from head to foot; if your ſenſations are good, you may feel, with a little attention, within yourſelf, pains in the ſame part as where the perſon is affected—or you may feel at the end of your fingers a heat, if it is an inflammation or obſtruction; if you feel a coldneſs, it is in the lymphatic veſſels; if bilious, you feel a numbneſs; and many other ways which different conſtitutions feel;—either of theſe circumſtances will inform you where the diſeaſe lies.—But by touching, which is the ſureſt way, you ſoon become certain of the ſeat and cauſe of the diſeaſe, which ſometimes lies in the oppoſite ſide to the pain, particularly in nervous affections, &c. You may touch, if you like, the cauſe of the diſeaſe, or charge it as you do the head; by that means you keep up the ſymptomatical pain, till you have rendered it critical—you ſecond the effort of nature againſt the cauſe of the diſeaſe, and act like a ſtimulus, which will produce a ſalutary criſis, by putting the whole frame in action, which will remove any diſeaſe proceeding from obſtructions, &c. after the patient finds himſelf compoſed, and the cauſe of the diſorder diminiſhed. When the patient is aſleep, you aſk him if it is time to take him out of it; if he anſwers Yes, draw your hands towards his head down to the feet, and rub your eyes with your thumbs ſeveral times, and wave your hand as if you were to fan a perſon who is too hot—you get by degrees backwards till he is recovered.

"The cauſe of moſt part of diſeaſes is an irritability or fever, debility or obſtruction; by the ſlowneſs or abolition of motion, it is an obſtruction or debility, and by its acceleration produces an irritability, inflammation, and fever.

"The ſeat of thoſe diſeaſes is generally in the viſcera, as the inteſtines, the ſpleen, the liver, the epiploon, the meſentery, the loins, &c. in women, the ſtomach, the womb, &c. Theſe aberrations or obſtructions are an impediment in the circulation of one part, which preſſes on the blood or lymphatic veſſels, and on the nerves, which produce thoſe ſpaſms, on account that the fluid circulates ſlowly. For that reaſon, thoſe perſons are the ſooneſt affected, and put into a criſis, when they are labouring under thoſe maladies; if thoſe veſſels preſs upon the root of a nerve, the

motion and ſenſibility of the correſponding parts are quite ſuppreſſed, as in an apoplexy, palſy, &c. There is not a better conductor for the animal fluid than the nerves, as they are ſpread all over the body; they abound more particularly in the diaphragm, ſtomachical and umbilical plexus, where lies the root of the nerves, which extend their branches (as a tree does its branches and roots in the earth) all over the body.

" Many philoſophers have thought it is in them that the ſoul lies: it is through them that the ſomnambules ſee in the dark when their eyes are ſhut.—When you treat a perſon, you muſt follow as much as poſſible the direction of the nerves; you may treat at a ſmall diſtance, and fix your hand upon the part affected, and by motion you put the column of air (which exiſts between you and your patient) into vibration, which will cauſe an irritation and produce a criſis.

" Many profeſſors make uſe of conductors, either glaſs, ſteel, ſilver, or gold; about eight inches long; they have a good effect in ſome caſes: all this proceeds from the idea of the operator. Mr. Meſmer tells us, ' When you make uſe of conductors, you muſt magnetiſe from right to right:' that is, the poles are changed.—I have repeatedly produced the ſame effect by treating from left to left, except when I have put a perſon into a ſleep without a conductor; if while aſleep I magnetiſed them from right to right, ſome have gone into a criſis, others have awaked. If you touch the forehead with your right hand, you muſt put your left in oppoſition behind; and in the ſame manner to any other part of the body, becauſe there is a re-action of fluid from one pole to the other, like a magnet; for Dr. Meſmer repreſents the human body as a magnet. If you eſtabliſh the North to the right, the left becomes the South, and the middle like the equator, which is without predominant action. I repeat it; it is moſt advantageous to be oppoſite the perſon you want to treat, in order to cure him effectually. Curing conſiſts in re-eſtabliſhing the diſturbed harmony—the general remedy is the application of animal fluid, which ſerves to re-eſtabliſh the equilibrium which is loſt in ſome part of the body. As there is but one diſeaſe, there is but one remedy; if motion is diminiſhed, it ought to be increaſed: if there is too great irritability, it ought to be decreaſed; as it is on ſolid bodies that this fluid operates, particularly on our viſcera, in order to rectify them, as they are deſtined by Nature to prepare, to diſſolve, and aſſimilate our humours, they ſhould be brought to their equilibrium by any means whatever, by employing either internal or external remedies; but we ought to be very cautious how we adminiſter them, except ſuch as the patients will order for themſelves or preſcribe for others, which are generally very ſimple. There are few remedies taken internally which are good, becauſe, when received into the ſtomach and the firſt paſſages, they experience the ſame elaboration as our aliments, the parts

of

of which analogous to our humours are aſſimilated there by chylification, and the heterogeneous particles are expelled by the means of excretions. Thoſe remedies which may be given will often prove to have effects contrary to the intentions of the preſcriber, becauſe moſt of them are very aqueous, ſtimulate too much, and will increaſe irritation, ſpaſms, &c. and produce effects diſcordant to the harmony of the parts, which ought to be eſtabliſhed and reſtored to their proper equilibrium. If treating is not ſufficient to produce vomiting in the caſe of a perſon who has too much putridity, or abundance of bile which has been too long ſtanding, then a gentle emetic is to be given, or magneſia if there is too much acid; if alkali is predominant, order a ſolution of tartar, or of any other acid which you think will agree with your patient. In caſe of a violent cholic or coſtiveneſs, or ſore throat, injections are the beſt. Theſe are the general remedies which ought to be adminiſtered to the patients, as I am ſure that all thoſe preparations of minerals, &c. which we ſee in an apothecary's ſhop, were never intended by Nature for the human body. Modern phyſicians have, from an intereſted view, neglected the knowledge of the vegetable kingdom, more adapted by Providence for the human body. The diet of the patient is whatever Nature points out to him: it is ſhe who dictates what every man ought to follow, becauſe ſhe ſeldom deceives us in our manner of living. It is not what we eat, nor the quantity, which does good—It is what we digeſt. Animals by inſtinct will never touch any thing but what Nature has dictated to them. In this their inſtinct is far ſuperior to our reaſon. Spirituous liquors are forbidden, ſtrong green tea without milk, coffee, hot aliments, and the uſe of ſnuff, becauſe it irritates the pituitary membranes in the throat, the ſtomach, and the head, and will produce diſpation and irritation. The uſual drink may be water with a bit of toaſt in it; wine and water, or good rich wine, old ſmall beer, good porter, lemonade, or different ſyrups, all theſe may be ordered according to the caſe of the patient. The food may be good broth, either of beef, mutton, or veal, chicken boiled, and roaſted meat. Avoid ſalt or fat meat; make uſe of ſallads, good ripe fruits, &c. Gentle exerciſe in the open air, either riding or walking. Cold or warm baths are moſt excellent; the drinking of ſome mineral waters is good:—in fact, a good obſerver (though not a phyſician) may cure more people than a man of the faculty—becauſe a doctor never goes without an apothecary—they all go together hand in hand, and do more harm than good.

"If you have but one patient, and cannot move him out of bed, gather round him as many healthy perſons as you can; make them rub their hands well—then make them hold one another, and communicate to the patient: this is what I call forming a chain,—by that you communicate to him the animal fluid, which will vivify him if he is not too much debilitated. You may ſet him upon an inſulated ſtool,

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as when you electrify a perſon; you may ſet him upon a chair, and make a healthy perſon ſit upon the ſame chair back to back. You may magnetiſe a tree in a garden; you may have one in your room, or a ſmall reſervoir.—There are various ways, which depend upon the idea of the magnetifer.

"There are ſeveral ways of treating and curing; in which, however, much attention and prudence are required. But a prudent man, willing to do good to his fellow-creatures who labour under any infirmities, will never treat his patient in public, and make them walk in their ſleep, or do many other things: it is very well to convince incredulous people of the effects, but cannot do good to the patient. I will ſay alſo, that a perſon cannot treat more than two or three patients in a day to do them juſtice, and thoſe who do treat more ſeldom cure by magnetiſing alone; the patients may fancy they have been cured;—but, if they had not been ſo treated, they might alſo have been well; as their treatments are long, Nature operates, and is a better doctor. There are ſome who will firmly aſſure you they have cured people at the diſtance of two or three hundred miles off, without ever having ſeen the patients, and have put them into criſes.—I will anſwer them, they are either fools or madmen; their imagination being heated with this idea, they are like viſionaries. I knew an ingenious phyſician who ſaw every body with the yellow jaundice, and another who thought that every body had a virus in their blood, and all the patients who applied to him he treated as having a *gallicus morbus;* and another who pretended to cure every body only by looking at them: all theſe are ſome degrees of infanity. I knew ſeveral perſons who ſuppoſed I had been treating them after I had left their houſes; they fall aſleep ſome twenty miles off, and they have related this as a fact to ſeveral of their friends, while I never thought of them; and nevertheleſs, ſuppoſe I had been treating them, and they might by chance fall aſleep, I could not with propriety relate the ſtory as a fact, becauſe it muſt be repeated often to hold good. I never reſt my judgment upon a ſingle experiment; in experimental philoſophy facts are ſtubborn, and no one can contradict them when repeated. Now I ſhall explain the manner of treating and curing effectually, on reaſonable principles, each complaint particularly.

"Suppoſe your patient has a head-ach. You ſeat him in a chair, the back towards the North, or otherwiſe; you ſit oppoſite to him; you put yourſelf in affinity with him, as I have obſerved before; you draw the general current, following the direction of the nerves; you hold your hands the ſame as if you were to hold a pen; you ſeek for the cauſe of the pain, which may lie in different parts—perhaps the patient will tell you, if you cannot find it out. If it is a hemicrania, which is owing to the foulneſs of the ſtomach, you fix your eyes upon your left hand, which you direct towards the ſtomach with your right hand—you do the ſame

as if you were to turn a pancake; this you repeat ſeveral times; by that means you ſtir the atmoſphere and relax the ſtomach, and may make him vomit; you may give a little warm water to promote your operation; you may alſo treat the head by drawing the fluid downwards, if the pain has been of long ſtanding; you may order a vomit or a gentle purge, and treat them every day, and then order bitters to ſtrengthen the ſtomach. There are different head-achs: as the *cephalalgia*, when the head is affected ſlightly in one particular part; *cephalæa* is when the whole head is affected; one ſide only is called *hemicrania*, and a ſmall ſpot affected is called *clavis hyſtericus*. Theſe various head-achs ariſe from different cauſes: if it proceeds from obſtructions, criſes are very ſalutary, as they put the whole body into motion, and will remove the cauſe. Treating the part which you think affected is very neceſſary; you do the ſame with one hand or both, by drawing your hands towards you ſeveral times as before. To treat the head, you may apply your hands upon the temples, and put your thumb upon the frontal ſinus, which will often remove it.

"Deafness.—If the want of hearing proceeds from a fault in the ſtructure of the ear, there is no cure. If it proceeds from cold, fever, hard wax, or dryneſs, you may magnetiſe according to my principles. You keep yourſelf within a yard or two, according as you feel a re-action: you then fix your left hand towards the ear, and you move your right open, and bring it towards the left hand, and do the ſame as if you were to clap your hands; by that means you put the air into vibration, and, guided by your left hand as a conductor, you apply the palm of the hand upon the ears; you may put your thumb in the ear, and with your finger, as you hold a pinch of ſnuff, preſs the thumb towards the ear—you accelerate the fluid into it. You may make uſe of a conductor, either glaſs or artificial magnet, and put it into the ear, and preſs with two fingers from the baſis towards the ear; you may magnetiſe the head, by drawing the fluid towards you: all theſe means you are to make uſe of according to your ſenſations and judgment; ſometimes an injection made of Caſtile ſoap—warm brandy and water will aſſiſt you in your operation.

"Of the Tooth-Ach—This violent, though not dangerous, diſeaſe, proceeds from rheumatiſm, obſtructed perſpiration, inflammation, &c. This being the caſe, you treat according to my rules. If there is inflammation, you draw the fluid from the head; you touch the temples, the frontal ſinus, the top of the head, the articulation of the jaws, and under the chin; you may touch the tooth with your index and thumb; but a ſure way is to get an artificial magnet, and, as your patient's face is towards the South, apply the South pole upon the tooth, and touch the next teeth, and afterwards draw the fluid downwards, and you will perform a cure.

"DISEASES of the EYES.—There is nothing ſo difficult to cure as theſe diſeaſes; and none of our organs is more ſubject to be affected than the ſight, or from ſo many cauſes. When they proceed from obſtructions in the cuſtomary evacuations, you muſt magnetiſe according to my rules. You treat the cauſe, alſo the eyes, by fixing your thumbs oppoſite; you preſs with the index the fluid into the eyes, you move your thumb oppoſite you; and may rub the eyes gently; you drop magnetiſed water into them with a quill: this you do three or four times a-day, and you order a little lemonade or ſyrup to your patient.

"The gutta ſerena, ophthalmia, cataract, ſpecks on the eyes, and fiſtula lacrymalis, are very difficult and almoſt incurable. I have heard many magnetiſers boaſting of the cures they had made of theſe diſeaſes. I have had more practice in that way than many of them; I confeſs candidly I have made but few. I ſhall explain the beſt manner of treating.—You muſt know firſt the cauſe, which you treat; afterwards you apply your thumbs gently on the eyes; you rub them often—you fix your thumb with the next finger at a diſtance from the eye; but I have had ſucceſs in ſome caſes of this kind by making uſe of an artificial magnet, by fixing it at the diſtance of half an inch from them; it has by that means removed ſpots and gutta ſerena, proceeding from the compreſſion of the nerves by ſuperfluous humours. I have dropped magnetiſed water three or four times a-day with ſucceſs; a proper regimen is neceſſary, and ſome internal and external application.

"Of the EPILEPSY and HYSTERIC AFFECTIONS.—Theſe diſeaſes are the opprobrium of the faculty, with many others, as they cannot be cured by internal medicines, except when proceeding from obſtructions, worms, or affection of the mind, &c. In thoſe caſes you treat according to the rules. Firſt, touch the head on the top; by applying your thumb on the root of the noſe, you endeavour to diſſolve the obſtruction which may be the cauſe; apply your hand upon the diaphragm, and endeavour to put the nerves in motion. You may treat at a diſtance alſo; but try to produce a criſis.—Dr. Andry, and Tourit, at Paris, have cured ſeveral epileptics by applying artificial magnets round the head, or like a horſe-ſhoe applied upon the top of the head; when they are in a fit, apply a magnet in each hand, it will ſoon recover them. I have brought ſome to, by applying a key in their hands; they are very good in ſpaſms, fainting, and cramps—by applying the magnet under the foot, it ceaſes inſtantly.

"Of the SCROPHULA, called the KING'S EVIL.—This diſeaſe is a diſgrace to phyſic. Some perſons have had the gift of curing by touching. I have ſeen in London two perſons who had been touched by a man after he was hanged; they were relieved; but I really believe it was the force of imagination; being frightened by the dead man made ſuch a revolution in the blood, that it removed the obſtruction

tion in the glands. You may touch your patient in thoſe parts, and draw the effluvia in order to ſoften the glands. If there is an ulcer, order the perſon to bathe the part with magnetiſed water, and keep a bit of rag always upon the part. Sea-bathing, decoction of celery, and hemlock-juice, may be tried, beſides treating.

"Sore Throat.—Sore throat, or any inflammation in the head, is to be treated by drawing the fluid out of the part, either by putting yourſelf in oppoſition, or by ſtanding on one ſide, and putting one hand behind the neck and the other before.

"Of the Palsy.—The palſy, when it happens to an old perſon, or has been of long ſtanding, is ſeldom cured; but if it happens to a middling age, and one ſide only is ſtruck, called an *hemiplegia*, a cure will be effected by being treated ſoon after. You may magnetiſe your patient oppoſite, as uſual. After you turn the ſide affected towards the North, you treat the oppoſite ſide, which is ſuppoſed to be where lies the cauſe: you may touch with one hand along the back-bone, or within an inch from it, along the great intercoſtal, by applying your right hand upon the ſtomach; you treat him about two hours; if you can put him into a criſis, which is very eaſy, you may expect to cure him. You make him lift up his bad arm, or have ſomebody to ſupport it; you put a conductor to his hand to attract the univerſal fluid; you may inſulate him, and turn the part affected towards the North; tie a ſilk ſtring to the ceiling, at the end of it have ſtrong compounded magnet, the North pole parallel to the hand; to the other hand tie likewiſe another ſtring, at the end of which there is a large piece of iron whoſe ſurface is larger than the magnet. Have an electrical machine, and connect the chain to the patient, then make him ſtretch his arm; then touch the magnet and the piece of iron together, or one after another, to the extremities of the hands, it will cure him; I have cured ſeveral that way: but this does not belong to Animal Magnetiſm, ſay many. But has not a magnetiſer a right to cure his patients as ſoon as poſſible, and employ every means his mind ſuggeſts to him? It is not ſo among the faculty; they muſt cure or kill them *ſecundem artem*, according to art. A general vomit or purge is often neceſſary; the diet muſt be good. If the tongue is affected, put a conductor upon it, or an artificial magnet, ſuch as you make uſe of for the teeth, by preſſing the fluid from the baſis towards the point on the tongue: ſometimes a little gargariſm is uſeful. Electricity and the cold bath are very good.

"Rheumatism.—Nothing is more common in this country than this diſeaſe, on account of the dampneſs and change of the weather, which will abſorb the electric and magnetic fluid from flying off certain parts, particularly from the feet, whence there flies out a greater abundance of fluid than from any other part of the body. It is for that reaſon dogs will follow our tracks. There are very obſtinate rheumatiſms which proceed from different cauſes, and are difficult to cure. The method

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of curing this diſeaſe is to magnetiſe the patient in oppoſition; try to promote perſpiration, by putting him into a criſis. If the rheumatiſm is in a particular part of the body, you muſt treat the part affected either by touching or rubbing, which is the beſt. You may make uſe of an artificial magnet in the form of a horſe-ſhoe. If the rheumatiſm is in the head, you apply it upon the top of it; if it is on the face and teeth, apply it on the temples; if it is in the hip, you apply it above the knee, with the poles up; if in the knees, apply it on the tarſus, with the poles up; if it is on the ſhoulders, you place it on the humerus, clavicula, &c. Electricity, hot and cold bath, earth-bathing, according to Dr. Graham's principles, &c. &c. Some internal and external applications will aſſiſt the operation.

"Consumption, or Decay.—This diſeaſe, ſo common in England, is difficult to cure; it proceeds from want of the animal fluid in the body, which waſtes it to nothing; therefore it is neceſſary that the perſon who treats be very ſtrong and healthy. His patient is like a child at the breaſt, pumping his animal juice; and he may be much hurt by it, like a child who ſleeps with an old or unhealthy perſon; therefore I would adviſe you to treat as few as poſſible. Riding a young horſe without a ſaddle, a cow, a bullock, or to be among cattle, is very good; or to ſleep in a ſtable, and communicate a rope from the bed to the cattle, which ſerves as a conductor to the animal fluid.

"Diſeaſes in the ſtomach are common in this country among women, owing to that pernicious cuſtom of wearing ſtays; not only ſo, but they muſt have a piece of iron or ſteel two or three inches broad, and proportionally thick, in it, called a buſk, which occaſions ſo many diſeaſes. They ſhould be looſe round the body. You treat the ſtomach by throwing fluid into it. Criſes are not good for it.

"Flatulency, or wind in the ſtomach and bowels, ariſe from want of tone in thoſe parts. It is to be treated upwards, which will make the patient break wind and produce a criſis, which is the beſt. After the criſis, you muſt treat the ſtomach downwards, in order to ſettle it; you may order carminatives. Bile on the ſtomach is treated upwards; alſo to make the patient vomit, and criſes, are good for it; a glaſs of magnetiſed water afterwards will ſettle the ſtomach. In all ſorts of inflammation of the lungs, liver, &c. you treat towards you, and avoid the criſis as well as when thoſe parts are ulcerated. In the ſtone and gravel you treat; throw a quantity of fluid, and produce criſis; it will promote evacuation, which may do ſervice to the patient. In external ſwellings, or ulcers, draw towards you, and bathe with magnetiſed water.

"Pregnant women, and in labour, may be treated without a criſis. I have magnetiſed women in labour, and put them aſleep while the accoucheur was performing his duty; the woman did not recollect it, and was ſurpriſed afterwards. I have

put a man aſleep who had an hydrocele; the ſurgeon performed the operation, but the patient never recollected any thing of it. Relaxation, and the blood flowing from a cut, may be ſtopped by fixing your thumb and preſſing the fore-finger over the part.

"Fevers of every kind may be cured by criſes; it is during that time that nature endeavours to get rid of what diſturbs her, either by perſpiration, vomiting, &c. Thoſe people are the beſt ſomnambuliſts, as I ſhall explain hereafter. It is very eaſily underſtood, by the method I have taken to explain the treating of the foregoing diſorders, that an ingenious magnetiſer may treat all others, as it would require a whole volume to explain them.

"Of Nervous Diseases. It is in thoſe diſeaſes that magnetiſm acts moſt forcibly, by putting the whole nervous ſyſtem in motion; it operates criſes as well as ſomnambuliſm, and offers to the attentive eye a vaſt field of obſervation. There is as great a variety in thoſe diſeaſes as there are combinations between all poſſible numbers. Different organs may be affected, and diſtinctly from others. In ſome perſons the extenſion of ſight is ſo great, that it ſeems as if they made uſe of a microſcope. Some of them can ſee, in the dark, the animal fluid flying in all directions, and appearing luminous; others will ſee the ſkin appear to them like a ſieve, and ſee the groſs humours or perſpiration as big as ſmall ſhot; and by rubbing the hands they ſee ſparks of fire coming out. Mr. Boyle mentions a perſon who, after getting half-fuddled with claret, (which I ſuppoſe relaxed the ſtomach and his nervous ſyſtem,) when he waked in the night, could ſee to read moderate print. Another who could in the night diſtinguiſh colours. Grimaldi tells us, that ſome women can, by their eyes alone, diſtinguiſh between eggs laid by black hens and thoſe by white ones. This ſingle effect will lead to many things which I ſhall relate about ſomnambules. We muſt not attribute to whim all the ſingularities which we obſerve among people affected in the nerves; it is a real cauſe, as that which determines the moſt reaſonable man. I knew a gentleman in London, who ſhook his head and arm every inſtant like a perpetual motion; a lady, I treated when in his company, had the ſame involuntary affection. There are different methods of treating thoſe diſeaſes, either by treating without criſes, or with them; ſuch people are the beſt ſomnambules. If a perſon is irritable, you treat gently, in oppoſition, by drawing a certain quantity of fluid from him; if, on the contrary, you throw the fluid towards him, you may put him into a gentle criſis; if the patient has a trembling of the limbs like the head, you treat that part: if you cannot ſucceed by treating, apply a magnetic bandeau round the head, it will ſtop it inſtantly. For trembling of the hands, you apply magnetic bracelets.

" To magnetiſe, or treat a perſon at a diſtance, is not impoſſible. The manner which ſeveral profeſſors make uſe of, is different. There are quacks in that art who pretend to have found it out before Dr. Meſmer; but that none of them underſtood it is well known. The faculty of our ſoul, thought, or idea, can perceive, contemplate, and unite itſelf to, any object, preſent or diſtant, viſible or inviſible. That it has action upon matter is well demonſtrated; it acts directly upon the vivifying electric and magnetic fluid, and by its will determines it to be directed upon ſuch part. We know that our ſoul acts upon our body, and forces any part of it to move in any direction, according to its will. This being the caſe, we may reaſonably believe that it may act as well upon merely organical matter as upon animal bodies. The thought, or ſoul, goes to any diſtance. No obſtacles can reſiſt it. It arrives and unites itſelf, by a ſympathetic power, to any object it wiſhes, without a maſter of ceremonies; neither the ſize of the body, its ſtrength, or figure, impede; all give way; the union is made in an inſtant; the will, and the will only, is the cauſe of it, becauſe it directs the fluid towards the diſeaſed and affected viſcera, by fixing them in your imagination, as much as it is poſſible; and by that means it will force the magnetic fluid to touch and to penetrate to a great diſtance any bodies to which the ſoul is willing to unite herſelf, and to reeſtabliſh the animal œconomy, of which ſhe is the indeſtructible principle. Theſe reflections ſhow the poſſibility, and the mean made uſe of, to treat a perſon at a diſtance; of which experience will ſhow the reality, and an ingenious mind may make many curious experiments: repeated trials will convince us.

" To treat a perſon at a diſtance, from one houſe to another, is poſſible, provided you have ſeen the perſon before, and put him in a criſis. The manner you do this, is to know where the perſon is, and fix the hour by your watch, and have ſome friends with the patient to divert him: you muſt be alone in a room, to avoid any noiſe, or any thing to diſtract the attention of your mind. In that poſition you paint the perſon in your imagination; you repreſent in your idea the part which you ſuppoſe affected, and you treat in the ſame manner as if the perſon were before you. That ſympathy of body and mind which exiſts between you and him will produce a criſis and ſomnambuliſm; that phænomenon is very intereſting. You may alſo from the ſame principles treat a perſon in the ſame room, without his or her knowledge, by fixing your mind and your eyes upon the part affected, or upon the heart, ſtomach, &c. and produce criſes and ſomnambuliſm.

" Dropsy. There are different ſorts of this diſeaſe, according to the parts which are affected. I ſhall treat of the manner of curing the aſcite, which is, when there is a collection of water in the belly, proceeding from obſtructions, living too low,

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and ſometimes from drinking ſpirits or cold water when the body is hot. You treat the patient in oppoſition; you fix your hands upon the part, either at a diſtance, or by applying the hands on the belly; you try to produce a criſis, which is the quickeſt way. You may apply a magnetiſed bell-glaſs on the belly when the patient is in bed, the ſame on the legs if they are ſwelled, and various acceſſaries, according to the operator's fancy. Dropſy of the brain, of the breaſt, and of the legs, are treated by extracting the fluid, and promoting circulation and perſpiration.

"Of the ASTHMA. This diſeaſe of the lungs is very ſeldom cured when it proceeds from a bad formation of the breaſt, or is hereditary. If it comes from obſtructions, treat the lungs, and put the patient into criſes to promote circulation; but if the aſthma proceeds from another cauſe, as violent paſſions of mind, humoreal or nervous, and the patient ſpits a great deal, treat the ſtomach upwards to promote expectoration. If the patient coughs much at night, give him a glaſs of magnetiſed water going to bed, and another in the morning. Moderate exerciſe in a gentle air is very uſeful.

"APOPLEXY. This ſudden loſs of the ſenſes may be cured by applying immediately, and with proper care. The cauſe is an effuſion of the blood, or a collection of watery humours. There are two ſorts, a ſanguine and a ſerous apoplexy; it is generally towards the brain that the cauſe lies, becauſe the blood does not return from the head. That being the caſe, you magnetiſe the patient either in bed or up: if he is in bed, you ſtay at his feet; you magnetiſe the head downward; you may get at his right ſide, and magnetiſe as before; you touch his head, one hand behind and the other before, and bring your hands downwards; you muſt raiſe the head of the patient high. If it is a ſanguine apoplexy, and you ſee there is no change, you may order a bleeding, or put the feet in warm flannel. Let the patient have free air. You muſt treat him four hours a-day.

"NIGHT-MARE. This diſagreeable diſeaſe puts the patient into the greateſt torture during his ſleep; he feels often a weight upon his ſtomach, as a fiend, a cat, a dog, &c. He endeavours to cry out, and fancies himſelf going to be drowned, or to be killed. It proceeds from a weak ſtomach, nervous affections, &c. I attended a patient who uſed to be blooded every year in May. During March and April he was always ſo; but, as ſoon as he was bled, the pain was over. They are a kind of ſomnambules. You may treat the ſtomach, by throwing a quantity of fluid, in order to ſtrengthen it; alſo treat the head downwards. A glaſs of magnetiſed water, going to bed, is very good.

"Of SENSATIONS, looked upon as a ſixth ſenſe. There are as many ſenſations as there are poſſible differences between proportions. In all ſenſations we muſt conſider

conſider three things; the cauſe producing the impreſſion, the nature and diſpoſition of the organs receiving it, and the ſenſations which have preceded it. It is by the combination of thoſe affinities that the organs of our ſenſes may be magnified or increaſed to ſuch a degree, as to become, for every object which they preſent to us, what teleſcopes and microſcopes are to the ſight; conſequently our ſenſations are the reſult of all the effects which objects make on our organs. Our ſenſes can only draw us more or leſs near to the knowledge of objects and their nature, by a conſtant uſe and a ſerious application, in order to attain to their reality. We have a great number of ſmall organs proper to receive ſenſations; but the habit we are in of making uſe of ſome particular organs only, abſorbs the reſt. Blind people have different ſenſations from us; they will perceive a wall, or other body, before they touch it. There is no doubt but we are endowed with an internal ſenſe, which is in affinity with the univerſe, and is conſidered as an extenſion of ſight; it is by theſe means one may comprehend the poſſibility of finding the diſeaſe of another: of foreſights, predictions, and the phænomena of ſomnambules and ſybils, &c.

"It is poſſible to be affected in ſuch a manner, as to have the idea of a body at an immenſe diſtance, in the ſame manner as we ſee the ſtars, the impreſſion of which is tranſmitted to us in a right line, the ſucceſſion and continuity of a co-exiſting matter between them and our organs, bounded by the nature of their form: why ſhould it not be poſſible, by the means of an inward organ, by which we are in contact with the whole univerſe, for us to be affected by beings, the ſucceſſive motion of which is propagated to us in curve or oblique lines, in any direction? and why ſhould we not be affected by the connection of beings which ſucceed one another?

"I was acquainted with Monſieur de Botinau, who had a place under government in the iſland of St. Helena. During twenty years he made a particular ſtudy of a ſenſe unknown to us: he could perceive a fleet or a ſingle ſhip two or three hundred miles off; laſt war he deſcribed M. de Suffrein's fleet, the number of ſhips, and thoſe which had paſſed by and did not touch at the iſland. He could do more: at ſea he could tell the diſtance he was off land, as has been proved by repeated experiments in the Channel. In confirmation of this, I have ſeen the certificates granted him from the governor and principal people of the iſland, and the petition and recommendation to the miniſter, who granted him 1800 livres per annum.

"The famous Bleton, called the *fourcier*, or ſpring-finder, whenever he walked upon ground where there was a vein of water, felt within himſelf a certain ſenſation which gave him notice there was water. Another countryman ſhook wherever there was water; the elementary, electric, or magnetic, fluid, paſſing through the pores of the earth, gave him that ſenſation.

"Of Crises. The criſes are an effort of nature againſt the diſorder, endeavouring to diſſipate the obſtacles that are in the circulation, and to reſtore harmony or equilibrium in all the parts of the body. Few diſeaſes can be cured without a criſis, particularly when it proceeds from obſtructions, &c. There are two ſorts of criſes. The natural one, which is attributed to nature alone, gets rid of what offends her by an increaſe of movement, producing vomiting, motion, perſpiration, &c. Theſe are the moſt ſalutary, as nature acts ſilently, without violence, and expels the obſtacles that impede circulation, by moving gently the molecules which form thoſe impediments, and go off by perſpiration, &c. The forced one is ſometimes ſalutary in obſtructions, or windy and bilious complaints. Theſe are produced when nature is inſufficient to expel what offends her. The uſe of Animal Electricity and Magnetiſm puts in action the whole body, and, in conjunction with her, acts efficaciouſly on the patient, and he diſcovers benefit and eaſe, particularly if it has produced evacuations, &c. There are various means of producing them, according to the ſubject, and the cauſe of his diſeaſe. Some ſay there are ſix degrees of criſes; I ſay there are as many as there are different conſtitutions to treat. Some will alſo call it the luminous criſis, from that new ſect called the illuminati. All theſe are imaginary. Suppoſe you have a patient on whom you would wiſh to produce a gentle criſis; you muſt put yourſelf firſt in affinity; then put your hand behind the head, and the other before, till the perſon is aſleep. If the perſon is agitated, calm him, by drawing the fluid downwards from the head; if you treat the cauſe by touching, it will increaſe the pain; if you put your thumb upon the frontal ſinus, they will fall into a criſis. You may magnetiſe your watch, and to ſhow what o'clock it is; they will go in. You may magnetiſe a flower, and give them a ſmell: they will fall in. Magnetiſe a harpſichord: as ſoon as you play on it, they will go in. Put a perſon between you and the patient, and magnetiſe him; you will put him in. To magnetiſe a pond, make the patient ſtay on the other ſide of it; you muſt ſtand oppoſite; make the patient hold a ſtick in his hand to touch the water; you muſt touch alſo the water with your magnetiſed conductor; the perſon will go into a criſis immediately. Have ſomebody behind him, to prevent his falling into the water: it is the beſt conductor of animal fluid. To make a perſon read, be behind him; you magnetiſe the lines as he reads: he will go in. To make a perſon ſtay behind you oppoſite the looking-glaſs, magnetiſe with a conductor the perſon in a looking-glaſs, that you may ſee him; the re-action of the fluid will produce a criſis. Magnetiſe a tree in a walk; make the perſon walk; as ſoon as he comes near the magnetiſed tree, he will fall into a criſis. One may put a perſon in a criſis from one room to another; and, in fact, an ingenious obſerver may, by what I have related, make a great many curious experiments, provided he has proper ſubjects.

"Of SOMNAMBULISM. Somnambuliſm is a ſtate between ſleeping and waking, partaking of both; the patient is a ſomnambule when he can do the ſame as if he were awake. Theſe natural ſomnambules, who get up at night, and do many wonderful things, are well demonſtrated. They are diſeaſed, and may be cured by treating. The magnetic ſomnambules are thoſe whom art has found out a mean of abſorbing or ſuſpending ſome of their external ſenſes for a while, and the patient eats and drinks, goes up and down, plays upon the harpſichord, and does many things which you deſire him, provided he be willing. The firſt I ſaw was at the Marquis de Puyſegur's, in the year 1784; and all thoſe who had pretended to it in this country before were impoſtors; for all this we are indebted to Dr. Meſmer. Whenever any perſon has a real ſomnambule, which is very eaſy, by care they have a treaſure. They are called by us *malades medecins*, or ſick phyſicians. Theſe beings ſee in the dark, and go through an external atmoſphere, the ſame as a glow-worm; they have beſides an internal atmoſphere, which they make uſe of to perceive objects preſent or diſtant, viſible or inviſible. I have had ſeveral who related to me what they could perceive. They differ in many reſpects according to their conſtitution. One muſt not depend always upon what they ſay, on account of their differing ſometimes. You may make them move in any direction, by your will alone; or, by moving your conductor any way upon the floor, they will follow its directions. You may make them play on any inſtrument they can play upon; they will read, write, and work; all this they will do better than if awake. Being deprived of their other faculties, theſe become ſtronger. No phyſician can tell the diſeaſe of a perſon better than a real ſomnambule. They ſeldom fail to tell unknown perſons their diſeaſes, and preſcribe for them. At a future time, when the ſcience is better eſtabliſhed, I ſhall publiſh a full account of the theory of ſomnambuliſm.

"Some will accuſe me of having ſaid too much; but thoſe who know me perſonally will never accuſe me of relating any thing which I cannot demonſtrate; and thoſe who repeat theſe marvellous narrations hurt themſelves and the ſcience in the eyes of really learned men. Thoſe ſtories, like tradition, which are handed down from generation to generation, and become improbable, like antiquity, loſe their former luſtre. I would adviſe my pupils to try thoſe experiments I have ſhown them firſt, and try others afterward.

"To make an ELECTRIC or MAGNETICAL APPARATUS. I ſhall not give you a full account of the apparatus of our ſociety in Paris. It is almoſt like a grove. Mine, which I had in London and Dublin, is a large oak tub, eight feet in diameter, well pitched in the inſide, about an inch thick, inſulated upon four glaſs-feet bottles of water well corked; you magnetiſe the bottles, and lay them down, the

neck of one in the bottom of the other all around, ſo that the laſt comes to the centre. You may fill up the ſpace with broken bottles, or any vitrifiable matter, brimſtone, or reſinous matter, minerals, &c. fill it up all but ſix inches; put ſome loadſtones and artificial magnets in different directions: then cover the whole to the edge with fine dry river-ſand, put the lid over; place in the middle a poliſhed iron bar about eight feet high, with ſprigs to it, to attract the univerſal fluid which concentres itſelf in the reſervoir. At the far corner place an arbor vitæ in a box, and place under it a ſtrong magnet, the north pole upwards; the ſouth pole is fixed in a hole upon the cover, by that means you increaſe the motion of the tree, and, becoming vegetaliſed, it will grow without water. You make holes all round, about eighteen inches diſtant; put iron or braſs conductors behind, ſo as to touch the patient who comes next to it. Connect a chain of an electric machine; inſulate your patients, and make them hold hands; it will increaſe the action in them. You may treat them in that manner; you will the ſooner put them into criſes. I have had all my patients round my reſervoir in a criſis at a time. I could not attend them. You may have a tree in a box, upon inſulated feet; have a ſmall box with vitrifiable matter, and fill it with water: you may make uſe of a large bottle filled with water only, and connect a chain to it. All this apparatus may be made differently, according to the idea. Some take every morning brimſtone or lozenges; and have brimſtone in their ſleeves, and rub themſelves with different ingredients; but I never made uſe of any, and produced a great many effects.

"To magnetiſe a tree, you muſt ſtand facing the north; you muſt have a conductor which you have magnetiſed; you muſt then point it from the top of the higheſt branches to the roots; do the ſame from the other branches: if the tree is ſo large that you cannot ſee the branches on the other ſide, change your poſition from ſouth to north, and do the ſame; then approach the tree; clap your hands round it, and ſtay in that poſition five minutes, your tree becomes magnetiſed. Any patient who has been in a criſis, or ſomnambuliſm, will diſtinguiſh it. Some will go in a criſis as ſoon as they come near it; others, if they are in ſomnambuliſm, will diſcover it among the reſt.

"You may magnetiſe a myrtle, or any other ſhrub; it will appear luminous in the dark. You may magnetiſe a flower, by putting your thumbs in the middle, and eſtabliſh an equator; then drawing your thumbs to the extremities, you preſs your thumb with the next finger, and you throw the fluid upon the flower; it will appear luminous in the dark; by giving it to a perſon to ſmell, who has been in a criſis before, he will go into one again.

"To magnetiſe a conductor or a cane, put your hands in the middle of it; ſlide your hands to the extremities, your thumbs at the top, and rub the extremities with them

them; by theſe means you will impregnate it with an electrical fluid, that ſeems luminous in the dark, and as ſulphurous as the electric rubbing.

"To magnetiſe a ſhilling, or a guinea, put your thumbs in the middle, and draw them to the extremities, it will appear as a ball of fire. A watch is magnetiſed in the ſame manner, by drawing your two thumbs at the top, and your index under it; eſtabliſh an equator, and draw your fingers to the two poles: by ſhowing it to a perſon who has been already in a criſis, he will fall in one again. They can tell you what o'clock it is in the dark; if aſleep they can tell you the ſame, by ſhowing a watch.

"To magnetiſe a harpſichord, fix your hands ſpread in the middle, and draw them towards the extremities; then rub the end you touch the ſtrings with one after another, in the ſame manner, and thus you will impregnate it with an electric fluid. As ſoon as a perſon plays upon the harpſichord, make your patient touch it with his hand or finger; he will fall in a criſis immediately.

"To magnetiſe a room, or a bed, is the ſame. Set it to the north, facing the ſouth; point your conductor up to the ceiling; bring it down towards you; point it to the weſt and eaſt, and bring it alſo to your feet; the room will appear all luminous, and the bed alſo.

"A pond may be magnetiſed in the ſame manner, by pointing your conductor over the ſurface of the water, from the cardinal points; touch the water with it, and make your patient do the ſame; he will have a ſhock in falling in, and it may be of ſervice to him. From theſe few experiments it is eaſy to conceive, that any inanimate body may be electrified or magnetiſed by another animal body, juſt as eaſily as by an electrifying machine, or by the force of magnets."

ARGUMENTS to PROVE, that ANIMAL MAGNETISM is the CAUSE of SYMPATHY in MAN and other ANIMALS, and in PLANTS, &c.

THAT conſtant flux and reflux of the vital principles and corporeal humours in man (without which both motion and life are ſtopped) produce thoſe effects of ſympathy and antipathy which become more natural and leſs miraculous; the atmoſpherical particle to each individual receives from the general fluid the proper attraction and repulſion. In the divers croſſings of thoſe individual atmoſpheres, ſome emanations are more attractive between two beings, and others more repulſive; ſo again, when one body poſſeſſes more fluid than another, it will repel; and that body which is leſs will make an effort to reſtore itſelf into equilibrium or ſympathy with the other body. Robin Abraham Benhannes ſays, iron or ferruginous particles are every-where, not only in the mineral world, but in our blood and bones; now,

now, as the magnet attracts ferruginous particles, every thing of courſe is ſubſervient to magnetiſm by the power of attraction or ſympathy.

I could relate a variety of examples to prove that ſympathetic affection which prevails with people of the ſame family, views, ſect, or any other cauſe that binds them harmoniouſly together; but, as it is a ſubject which every one muſt have experienced, I ſhall not touch further on it.

The magnetic fluid often occaſions ſome contractions in other parts of the body, when a muſcle has been wounded, which produces different motions in the organs of the ſame body. Whether they have a ſecret affinity or not is a queſtion not yet determined; however, I am inclined to think they have. Theſe motions have aſtoniſhed many phyſicians who have reflected upon this art, particularly Barthe, who has well explained them by a ſubtile motion which he calls *vital fluid*, and which he might as well have called animal electricity and magnetiſm.

Of ANTIPATHY.

WE do not all reſemble the Trojan ſhepherd, who awarded the apple to the faireſt; it is not always the handſomeſt woman that wins our affections; our interior emotions are involuntary ſeizures independent of the influence of beauty, and are the forerunners of love. So again, when two atmoſpheres are in equilibrium, that is to ſay, when thoſe corpuſcular emanations are in affinity with each other, it produceth ſympathy, or attraction; but, when thoſe atmoſpheres are croſſing each other, it produceth antipathy, or repulſion.

The diſcordance of tempers, religious diſputations, politics, &c. have frequently been the cauſe of inveterate hatred; how can we otherwiſe account for that ſudden averſion we feel for certain objects or perſons, if it be not in the diſagreeable impreſſions communicated to the nerves, and then to the brain, from the emiſſion of thoſe perſons or objects? This can be called by no other name than antipathy.

By antipathy many people find out the diſeaſes of others; they feel within themſelves, in the oppoſite ſide, the ſame pain the other perſons have. If I put a diſeaſed perſon in contact with another perſon in ſomnambuliſm, they inſtantly feel the ſame pain; only, however, during the time they are in contact. It may be called ſympathy; but, as they ſuffer in ſome proportion during that time, it is properly antipathy. It is well known there are many people who entertain an antipathy to different animals, &c.

EFFECTS of ANTIPATHY and SYMPATHY in BRUTE ANIMALS.

ANIMALS in general, like ourſelves, move at the aſpect of pleaſure, and fly from that of diſtreſs; in ſome reſpects they are ſenſible beings that ſeem to enjoy a

will adequate to determine their different motions, nay, ſometimes to be poſſeſſed of the ſentiments, vices, and paſſions, of mankind, and experience likewiſe inclination and hatred, which ſeldom vary in their objects; whence proceeds that conſtant love that ſome animals ſhow for certain ſpecies, whilſt they bear the ſtrongeſt antipathy and averſion to others. They are differently affected according to their different ſpecies by corpuſcular emiſſions, but are nearly the ſame when they flow from the ſame ſpecies. Hence the one conſtantly becomes the object of the other's averſions. Thus one animal only lives to deſtroy and devour; and in his turn contributes, by his own deſtruction, to the preſervation of a ſtronger animal. Thus nature is ſupported by theſe ſucceſſive deſtructions; new combinations ariſe from the compoſitions operated in her boſom; like the phœnix, ſhe only dies to revive, and return brighter out of her own aſhes. Without thinking (as the ancients did) that a ſtring made out of the bowels of a wolf and another from a ſheep cannot agree, or, if two drums made out of their ſkins, the ſound proceeding from that of the wolf-ſkin would deprive the other of all ſound, antipathy between certain ſpecies is evidently a means allotted them by inſtinct to diſcover their prey or avoid their enemy. Thus the wolf purſues the lamb, the dove dreads the falcon, the wren the eagle, the gold-finch the toad, the hen the fox, the water-fowl the ſtork, the graſshopper the ſwallow, the blackbird the hawk, the nightingale the butcher-bird, the frog the eel, the ſnail the partridge, the oyſter the crab, the tench the pike, the fly the ſpider, and the ſpider the ſcorpion. The lion diſlikes the cock, the ape the tortoiſe, the horſe the camel, the lizard the ſerpent, the boar the ſea-calf, the martin the vulture, the owl the crow, the tunny the dolphin, the conger the lamprey, with an infinite number of others too tedious to be mentioned. The ſmell of lobſters drives bees away; the owl deſtroys the eggs of the crow, the ſtork thoſe of the bat; the weaſel thoſe of the hen; the heron and the lark are continually at war, by deſtroying each other's young. If the eagle devours the ſerpent, the latter climbs up the rocks and revenges itſelf by ſucking its enemy's eggs; the toad and the rattleſnake, under the graſs, by darting through their pores the magnetic fluid, faſcinate their prey; the weaſel in vain endeavours to avoid them; ſhe leaps from one place to another, and her ſtrength is at laſt exhauſted to no purpoſe; obliged to draw near the enemy, ſhe iſſues a diſmal cry, and, being violently attracted towards the reptile's mouth, precipitates herſelf into it, and there finds her grave. To revenge this victim, the field-ſpider ſpins her web ſuſpended over the toad: her influence troubles and at laſt lulls him to ſleep. In like manner the ſtag's breath attracts the ſerpent, and occaſions in him a giddineſs. The viper, with fiery eyes and contracted muſcles, darts venomous corpuſcles on the branch of the tree where the nightingale finds an aſylum; ſoon after, the wood-ſinger loſes his voice, is thrown into convulſions, falls down,

and is devoured by the viper. It is owing to the effects of emiſſion that the hound finds out the game, and purſues it to its den, where it ſeeks for a refuge. It is by this ſame ſenſation that the partridge ſtops in the middle of a fallow ground, and forgets ſhe has the power of flying.

Animals are as ſuſceptible of ſympathetical as of an antipathetical attachments: according to ſome naturaliſts, the fox is fond of the ſerpent's company, and the duck of that of the toad; the bear avoids treading on the ant, the nightingale loves the peacock, the kite protects the cuckoo, partridges and pheaſants doat on the ſtag, and doves on teal. We are told that a lizard, elephant, and dolphin, are fond of a man; but this is nothing to the attachment of a dog to its maſter: he follows him to all places; and, ſhould he happen to loſe ſight of him, he ſtill finds out where he paſſed only by the emanation he has left in his way, (which eſcapes more abundantly through the toes, as being more porous;) and, if he meets him, by a thouſand tranſports teſtifies his joy.

Of ATTRACTION and REPULSION, otherwiſe called SYMPATHY and ANTIPATHY, in PLANTS.

PLANTS, like men, have their tranſpiration and emiſſion produced by a preſſure of a magnetic fluid which penetrates them; and they carry in all their fibres that vivifying fluid, and have alſo their particular ſpheres of attraction and repulſion. Hence that inclination that ſome vegetables ſeem to have to come nearer to each other, to grow and die together; hence that hatred that has been obſerved amongſt others, and the efforts ſeemingly made uſe of to repel each other.

The vine ſeems to improve under the elm, the olive-tree with the aloe-tree, the plantain with the fig-tree, the agaric with the cedrus, aſparagus with penny-royal, and the cocoa grows powerfully under the ſhade of ebony; the reſinous-tree is favourable to the femla, and the cotyledon and the fir-tree to the different ſpecies of aconitum and ſolanum. By a like ſympathy the poppy adorns the harveſt, the water-lily likes the ranunculus, and rue likes the water-lily; the lily ſprings delightfully by the roſe, near garlic, where it appears more ſhining, and ſmells more perfumed, notwithſtanding the ſmell of the latter is ſo offenſive; the roſe is unfavourable to onions, baſilicum dries up near rice, and cabbages die away near the cyclamen and origanum; the oak does not like the olive, the vines diſlike laurel and hemlock, and hemlock dies away near the vines. The latter brings to our recollection the doctrine of old Robin Abraham Benhannes, who in the 14th century attributed the colour of wine and its fermentation to the ferruginous particles of the grape, and to their union by magnetiſm. The effluvia from the hands or any part of man's body is the cauſe why flowers or herbs droop when touched; the ſenſitive

plant

plant is a ſtriking inſtance of the force of this obſervation. The muſcicapa, or catch-fly, mimoſa, and oxalis, the flower martima, annona, dandelion, pimpernel, flower of ciſtus, helianthimum, epine venette, and caſtus opuntia, acquire a very remarkable motion by irritability.

We could take notice of numberleſs others; in fact there are none inſenſible to the emanation of ſurrounding bodies; all move in a reciprocal ſphere of attraction and repulſion. The ſun, whoſe heat attracts the magnetic fluid, dilates or contracts plants in general according to the ordinary courſe of nature, the granadille, (which in fine weather ſhows the time of the day,) the tragopogon, or goat's beard, heliotropus, the cameliorus, and chryſanthemum (or daiſy of the field), the tulip, the lily of Perſia, and a few more, ſhow by their motion the courſe of the ſun, whoſe influence attracts in their different ramifications the principles that vivify them.

When the ſun darts his ray, the enamelled flowers regtiſe and acaſſia open their leaves to receive the influence; but, if he withdraws from the horizon, you ſee their leaves claſp and their flowers decay, till the all-enlivening beam again vivifies them. There is a kind of clover put in action, by the ſolar heat, according to the different degrees of the efficient fluid. This clover will appear whitiſh in the morning, of a purple colour in the middle of the day, and towards the evening it looks yellow and pale. It is the abundance of that fluid in ſome plants which renders them ſo apt to inſpire men and other animals with deſire of love; and it is the want of it in others that appeaſes the heat of blood, and ſtops the progreſs of riſing paſſion.

CONSIDERATIONS on the INDISPOSITIONS and DISEASES of MAN.

MAN, with regard to his preſervation, ought to be conſidered,

1. In a State of Sleeping.
2. In a State of Waking.
3. In a State of Health.
4. In a State of Indiſpoſition.

If we ſurvey all nature, we find in men, animals, plants, &c. but two principles, matter and motion. The whole of the matter which conſtitutes him may be either increaſed or diminiſhed. The diminution ought to be repaired from the general maſs by the means of aliment, as food, drink, and other ſtimuli.

Motion in like manner be either increaſed or diminiſhed. The diminution occaſioned by motion, as walking or any other bodily exerciſe, is repaired by ſleep. Man ſuſtaining two kinds of loſſes, it neceſſarily follows that there muſt be two kinds of reparation in the ſtate of ſleep. Man acts like a machine whoſe principles of motion are applied inwardly, and independently of the organs of ſenſe. The

ſleeping

ſleeping ſtate of man is when the uſe and functions of a conſiderable part of his individual faculties are ſuſpended for a while, during which the quantity of motion loſt while awake is repaired by the general currents in which he is placed. There are two ſorts of currents with regard to man—gravity, and the *magnetic current* from one pole to the other; that is to ſay, from head to foot, man receives and collects a certain quantity of the univerſal current as if in a reſervoir; the overplus of motion (or the overflowing of this reſervoir) determines the ſtate of waking. This exiſtence of man begins in a ſtate of ſleep; the degree of motion he receives in that ſtate, proportionate to the maſs, is employed in the formation and unfolding of his organs. As ſoon as his formation is completed, he awakes, and makes efforts on his mother powerful enough to bring him into the world. If his conſtitution is debilitated, his motion being too ſlow owing to his weakneſs, he will preſent a wrong poſition, and will not come into the world without aſſiſtance, from not having ſufficient ſtrength to turn himſelf the proper way.

Man is in a ſtate of health, when all the parts of which he is compoſed have the power of exerciſing the functions they were deſigned for with pleaſure and eaſe. If there is perfect order in all the functions, it conſtitutes a ſtate of harmony or equilibrium. Illneſs is the oppoſite ſtate, wherein harmony is diſturbed, and is either extended over the whole ſyſtem or confined to one part.

Health may be repreſented by a right line. Illneſs is a deviation from that right line: that deviation is more or leſs conſiderable, according to the ſtrength of the diſeaſe; the remedy adjuſts the order or harmony which was diſturbed; the quantity of the univerſal motion that man receives in his origin becomes tonical by being modified in the womb, and helps the unfolding of the viſcera, and all the other organical parts of his conſtitution.

This power of motion is the principle of life; this principle maintains and rectifies the functions of the viſcera. Viſcera are the conſtituent and organical parts, which prepare, rectify, and aſſimulate, all humours, determine their motion, ſecretions, and excretions. The vital principle, being a part of the univerſal motion, and obeying the common laws of the univerſal fluid, is conſequently ſubjected to the impreſſions of the influences of celeſtial, earthly, and particular, bodies with which it is ſurrounded. That faculty or property of man, which renders him ſuſceptible of all theſe impreſſions, is animal magnetiſm or animal electricity.

Man, being conſtantly in the univerſal and particular currents, is penetrated by them; the motion of the modified fluid by the different organizations of its conſtituent parts becomes tonical; it follows in that ſtate the continuity of the body to the extreme parts. From theſe extremities of the body either flow out or paſs in

currents the univerſal fluid, when another body capable of receiving or returning them is placed in an oppoſite point.

1. There is a circulation formed between the currents paſſing in and out. 2. Theſe currents are ſtraitened and almoſt re-united in the ſame point; and theſe two cauſes concur together to increaſe ſucceſſively the celerity of motion.

Theſe points of emanation or introduction to or from the tonical current are poles, bearing analogy to thoſe we ſee in loadſtones or artificial magnets; conſequently there are ſome currents coming or iſſuing out of the poles which deſtroy or ſtrengthen each other; their communications being the ſame, it ſuffices to determine one for the oppoſite to be formed at the ſame time. Upon a ſuppoſed line between two poles there is a centre or point of equilibrium, the acting of which is ſuch that no direction is predominant. Theſe currents may be propagated and communicated at any diſtance whatever, either by continuities, connection of bodies and minds, as ſympathy, or that of a fluid, ſuch as air, water, ſound, &c. It is a conſtant law, that in each variety of an intermediate body, the poles are either overturned or changed.

All bodies whoſe form ends in a point or angle ſerve to receive the currents, and become their conductors. We may conſider the currents as openings or channels to convey other currents. Currents can penetrate all ſolid and liquid bodies, preſerving always the direction they have received. Theſe currents may be communicated and propagated by any means, whenever there exiſts a continuity, either ſolid or fluid, in the rays of light, and by a ſucceſſion of the vibrations of ſound. Theſe currents may be reinforced, 1. by cauſes of common motion, ſuch as the inteſtines, and local motion, ſound, noiſe, wind, &c. the electrical friction, and every other body which is a loadſtone, is already endowed with a determinate motion, by animate bodies, by trees, and all vegetables: 2. by their communication with hard bodies in which they may happen to be concentered and aſſembled, as in a reſervoir, to be afterwards at pleaſure diſtributed in every direction: 3. by the multiplication of bodies to which they are communicated, that principle being not a ſubſtance; by a modification its effect increaſes like that of fire, in proportion to its communication. If the current of animal electricity and magnetiſm concurs in its direction with the general magnetic current of the world, the increaſing of all theſe currents is the general effect which reſults from it. Theſe currents may again be reflected by looking-glaſſes, after the laws of light.

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Of INDISPOSITION and DISEASE.

IT has been obſerved, that man's life is a quantity of univerſal motion, which in its original becomes tonical, applied to matter, deſtined to form the organs and viſcera, and afterwards to maintain and rectify their functions. Man's life begins in motion, and ends in reſt. The entire abolition of tonical motion is death. As in all nature motion is the ſource of every combination, as well as reſt is of matter, ſo, in man, the principle of life becomes the cauſe of death.

Every unfolding and formation of an organical body depends on the various and ſucceſſive relations between motion and reſt; their equality being determined, the number of poſſible relations between the one and the other ought alſo to be determined. The diſtance between two terms or given points may be conſidered as repreſenting the duration of life; one of theſe terms or points is motion, the other reſt. The ſucceſſive progreſſion of the various proportions of the one and the other conſtitutes the progreſs and revolution of life. Proceeding thus from motion to reſt, we arrive at the point of their equilibrium; after that point we begin by degrees to die.

That progreſſion of divers modifications between motion and reſt, may have an exact proportion, or that proportion may be diſturbed. If man runs through that progreſſion without the proportion being diſturbed, he lives in a good ſtate of health, and arrives at his term without illneſs: on the contrary, as ſoon as the proportions are troubled, diſeaſe begins. Illneſs is nothing elſe but a perturbation in the progreſſion of motion and life, which may be conſidered as exiſting either in ſolid or fluid bodies. If it exiſts in ſolids, it diſturbs the harmony of the properties of organical bodies by diminiſhing the one and increaſing the other. If it exiſts in fluids, it diſturbs their local and internal motion.

The aberration from motion in ſolids, by altering their properties, diſturbs the functions of the viſcera and the various elaborations which ought to take place. The aberration from the inteſtine motions of humours produces their degeneration. The aberration from local motions produces obſtruction or debility, fever or irritation.

The ſlowneſs or abolition of motion produces obſtruction, or debility; the acceleration of motion produces fever, or irritability. The perfection of ſolids or viſcera conſiſts in the harmony of all their properties and functions; and the reſult of the functions of the viſcera is the quality of fluids with their inteſtine and local motion. To be able to rectify the general harmony of the body, we muſt rectify the functions of the viſcera; becauſe, their functions being once re-eſtabliſhed, they rectify every thing that can be ſo, and divide every thing that cannot be rectified.

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That effort of nature or viſcera upon the humour is called *criſis*, or paroxyſm; and no diſeaſe can be cured without a criſis. In all criſes, we diſtinguiſh three ſtates, the perturbation, digeſtion, and evacuation. Diſeaſe being an aberration from harmony, that aberration or prediſpoſition may be more or leſs conſiderable, and produce more or leſs ſenſible effects, which are called *ſymptoms*. If thoſe effects are produced by the courſe of the diſeaſe, they are called *ſymptomatic ſenſations*; if on the contrary they are the efforts of nature againſt the cauſe of illneſs, they are called *critical ſymptoms*. It is of the greateſt moment to diſtinguiſh them well in practice, to prevent and ſtop the one, and favour the other.

It follows from what has been ſaid, that all cauſes of diſeaſe diſturb and alter more or leſs the proportion between matter and motion, the proportion of the viſcera, the proportion between fluids and ſolids; and conſequently they produce by their different applications a remiſſion or perturbation more or leſs conſiderable in the properties of matter. To remedy the effects of remiſſion and their perturbation, and to deſtroy or ſtop them, the remiſſion of properties muſt be provoked; that is to ſay, in animal bodies, the irritability or animal electricity muſt be increaſed by different ſtimuli. There are two methods of doing this: 1. to leſſen the obſtacles; 2. to increaſe the action of nature, by a continual, ſhaded, ſoft, and harmonic, application of magnetic currents.

A body being in harmony is hardly ſenſible to the effect of animal electricity and magnetiſm, becauſe that the application of an uniform and general action cannot alter any thing in proportions which are both exact and already conſervant with that harmony. If on the contrary a body is not in harmony, that is to ſay, if it is in that ſtate wherein proportions are diſturbed, the habit it is in to experience that diſſonance hinders it from being more ſenſible, and it becomes ſo by the application of animal electricity and magnetiſm; becauſe that diſpoſition and diſſonance are increaſed. On theſe principles it is eaſy to conceive that ſick perſons drawing near their recovery become gradually inſenſible to animal electricity and magnetiſm; that abſolute inſenſibility to its power conſtitutes the perfect cure.

It follows, from the ſame principles, that the application of animal electricity and magnetiſm muſt often increaſe the pain, as its action occaſions the ſymptomatic ſenſations to diminiſh or ceaſe; and the efforts of nature againſt the cauſes of diſeaſe being increaſed, it is abſolutely neceſſary for the critical ſymptoms to increaſe in the ſame proportion.

It is by the exact obſervation of their ſeveral effects that we are enabled perfectly to diſcern the ſymptoms. The unfolding of the ſymptoms is made in the contrary order by which the diſeaſe was formed, and may be compared to a ball of twine which winds off in the contrary order to which it was wound on.

Of HUMAN IMPREGNATION—FORMATION of the FŒTUS—ORIGIN of DISEASES—and PRINCIPLES of LIFE and DEATH.

IT was not my intention to go into this Treatiſe ſo much at large, in my preſent work; but conſidering that the ſubject is of the higheſt importance, and that the Medical Part could not be made complete without it, I have reſolved to introduce it here, though I ſhall be under the neceſſity of extending my Plan to a few more numbers. Theſe, I truſt, will not be unacceptable; ſince they will be accompanied with a ſet of very curious and valuable plates, deſigned on purpoſe to illuſtrate this intereſting ſpeculation.

In contemplating the works of creation and the word of God, unfolded to us by the light of Revelation and Scripture; by analogy, reaſon, medical experiments, and anatomy, we are enabled to trace the human œconomy farther in her retirement, and deeper in her occult retreat, than ſome medical men are willing to ſuppoſe. Impoveriſhed by a faſhionable ſtyle of living, and driven to the neceſſity of multiplying potions and fees, their object is not to heal, but nouriſh the ſeeds of human infirmity. The truth of this remark has been but too often experienced; and indeed *confeſſed* by ſome, in thoſe awful moments, when diſſimulation would be vain. Far be it from me to arraign the profeſſional character in its general capacity; it is only the medical locuſts that I wiſh to eradicate; and I am perſuaded every good man in the faculty would with heart and hand aſſiſt me in ſo laudable a purſuit. It was principally with this view, and to aſſiſt private families in the moments of extremity, that I was induced to offer thoſe ſimple modes of cure and ſelf-preſervation, ſo amply diſpenſed in my edition of Culpeper's Engliſh Phyſician. And my preſent purpoſe being to make that invaluable family-book ſtill more complete, I ſhall here explain the nature of human generation, and the principles of animal life, that I may from thence deduce the origin of hereditary diſeaſes, and point out with more facility thoſe which are accidental. And in this treatiſe I ſhall endeavour to furniſh my readers with ſuch obvious directions for *eſchewing the evil, and chooſing the good*, as, if reſolutely followed, will not fail to preſerve health and long life, and prove of no ſmall benefit to future generations.

When God created Adam, he planted in him the ſeeds of that Divine Eſſence, requiſite to propagate the human *life* and *ſoul*. Theologiſts may contradict me; yet I will not ſo much derogate from the wiſdom and omnipotence of the Creator, as to ſuppoſe he ſhould watch the impregnation of every human female, and, by ſo many ſeparate and diſtinct acts of his power, give life, ſpirit, and *ſoul*, to the fœtus. The Creator of Man, viewing with unbounded foreſight the purpoſes before him,

by one act of his omnipotence blended in Adam all the faculties of the human and celeſtial nature; and without any doubt, when he was formed *one, in God's expreſs image*, he poſſeſſed the means of propagating from his own eſſence, beings like himſelf. It is here difficult to aſſociate the imperfect ideas of human reaſon with the mechaniſm of Divine Wiſdom; and yet our conception may in ſome degree unravel the myſteries of nature by cauſes and ſpeculations, which, in proportion as they captivate our ſenſes, and raiſe our admiration, excite in us a reverential awe of futurity, and a grateful ſenſibility of the goodneſs and mercy of him who gave us being.

From the evidence of Scripture it is indiſputably clear, that in the perſon of Adam the male and female properties were originally combined; as indeed we now find them in many ſpecies of the lower claſs of animals. In Geneſis i. 27, we read, that *God created man in his own image*, i. e. of perfection; including or containing the prolific or generating powers, which are diſtinguiſhed by the expreſſion of *male and female;* and *God bleſſed them*, i. e. theſe male and female properties, *and ſaid unto them, Increaſe and multiply, and repleniſh the earth*, i. e. with beings like Adam: for this benediction, and this command, were *antecedent* to the formation of Eve, as every one muſt know who reads the Scriptures.

In this *plural* capacity, therefore, Adam received the bleſſing of God, when he ſaid unto him, *Be fruitful and multiply, and repleniſh the earth, and ſubdue it; and have dominion over the fiſh of the ſea, and over the fowls of the air, &c.* The ſix days creation were now completed; and on the ſeventh day God reſted from all his work; and, having formed Adam, and breathed into his noſtrils the breath of life, *he became a living ſoul.* God alſo planted the garden of Eden, and put the *man* into it, to till it and to dreſs it; and God commanded the *man*, ſaying, Of every tree of the garden thou mayeſt freely eat; but of the tree of the knowledge of good and evil, thou ſhalt not eat of it; for in the day thou eateſt thereof, *thou ſhalt ſurely die.* Gen. ii. 27.

Let it here be noted, that all theſe tranſactions, injunctions, and commands, had paſſed *before Eve was formed*, or, in other words, before the male and female eſſences were ſeparated, and made the eſſential parts of two diſtinct perſons. Adam likewiſe, before the event took place, was appointed God's viceroy over all earthly things, both animate and inanimate; the very elements being made ſubject to him; for *he was formed more noble than the angels, and crowned with glory and honour;* i. e. having the peculiar advantage of *multiplying his own race.* He was, as to his external form, moulded of the celeſtial æther; and therefore, previous to his fall, his body emanated rays of brightneſs and ſplendour, ſimilar to thoſe which our ideas furniſh of Moſes and Elias when they converſed with God. His reaſoning faculty, and living

ing ſoul, were formed of the eternal eſſence or tincture of the Divinity; being nothing leſs than what is termed the *breath of God*, that ſpark of immortality which generates *ſoul* and *body*, and is the diſtinguiſhing characteriſtic between man and beaſt. For, although brute animals inherit the five ſenſes, and poſſeſs an inſtinct to direct them in the choice of food, and to impel the propagation of their ſpecies; yet theſe are only ſenſes formed from the *out-birth*, or four elements of nature; and not from the eſſence or tincture of the Divinity, out of which the ſoul, the mental intellect, reaſon, ſenſe, and underſtanding, are all formed, and transferred to poſterity. *For with the powers God has endued man, with the ſame powers ſhall he multiply his race.*

From the foregoing paſſages we are warranted to infer, that the original man was poſſeſſed of his ſpiritual ſoul, and rational intellect, for the purpoſe of propagating the ſame to all future generations. By the force of this rational intellect, or eternal ſpirit, unclouded by the deformity of ſin, he knew and perceived the nature and property of every animated being; and to exerciſe this intellect, God brought before him every created thing, to ſee what he would call them; "*and whatſoever Adam called them, that was the name thereof.*" He knew and perceived the nature and quality of all animals; and, according to their deſignation and ſubjection to the external elements, ſo he aſſigned them thoſe names which they have ever ſince borne. Adam, however, in his primeval ſtate, was not himſelf under the influence of celeſtial or terreſtrial elements; but, on the contrary, they were ſubject to his controul. He was immortal; they corruptible. They ſprung out of time, and were elementated; he ſprung from the limbus of eternity; and into eternity the divine eſſence, or ſouls, propagated from him, muſt indiſputably return.

But man, thus created in honour and immortality, abideth not. The purpoſe of his creation was to fill the place of the rebel angels; and hence Lucifer became his mortal foe. This fallen Spirit had entered the gate of Eden, and was preparing to ſeduce Adam, when the Almighty conſtituted the teſt of his obedience; for having endowed him with a *free-will*, an innate power of *chooſing good* or *evil*, and of multiplying the ſame, it was but reaſonable to expect from him an implicit obedience, and an angelic race. He that is alone eternal and omnipotent, could not but foreſee the ſubſequent event; and it is his ſupreme goodneſs to counteract evil, by preventing its worſt conſequences. Foreſeeing that the prolific tincture, or eternal eſſence of fecundation, might be contaminated by the malignant ſpirit of Lucifer infuſing itſelf into the mind of Adam; who then, inſtead of multiplying an angelic race, would generate devils; and that, were man to fall in his individual capacity, there was no counterpart, no feminine principle, through the medium of which

the *ſerpent's head could be bruiſed,* or a Saviour become incarnate;—Therefore on a further ſurvey, after the works of creation had been completed, animals named, and man formed and compounded of the male and female tinctures, God ſaid, Gen. ii. 18. *It is not good that the man ſhould be alone; I will make him an help meet for him;* wherefore the rib, i. e. the feminine or conceptive eſſence, was taken out of Adam, and concentrated or moulded into a new being called *woman.* The emiſſion of this feminine eſſence or tincture threw Adam into a deep ſleep; yet, when he awoke, he knew that an eſſential principle had departed from him, and that the woman was *bone of his bone, and fleſh of his fleſh,* not having been created, *but formed out of himſelf,* whereby he only retained the animating principle, or active power of generation; whilſt the rudiments or ſeeds of future beings were conſigned to the matrix of the woman. Here then individual generation ceaſed; and Adam, without the *counterpart of himſelf,* had no longer the power to increaſe and multiply. Thus the two tinctures, or divine eſſences, animating and compounding ſoul and body, were divided; and by means only of a re-union or contact of thoſe tinctures, could generation then, or now, be performed. It is on this ground that the male and female affections are continually turned towards each other; and that the deſire of love and union ſo ſtrongly pervades every individual of the human race. Hence alſo the Tempter's reaſon for beguiling Eve; and hence the ſeducing power of love, which determined Adam to ſhare in all the horrors of her crime, ſo pathetically and affectingly deſcribed by Milton.

The fatal conſequences of the fall, we moſt ſenſibly feel, and univerſally deplore. The earth ſhook from her foundations. The order of nature was quite inverted. The ætherial and terreſtrial elements, which before were faſhioned in harmony, and acted in uniſon, were now diſcordant, intemperate, and furious. Brute preyed upon brute, and bird invaded bird. The delicious fruits and flowers of Paradiſe were exchanged for thorns and thiſtles. The ſerenity of a pellucid and ſmiling firmament, was convulſed by the thunders of an incenſed Deity, by forked lightnings, by contending ſeaſons, by devouring winds, and impetuous ſtorms. While man, ungrateful man, from the privilege of holding theſe elements in ſubjection, became ſubjected to them; and hence ſubject to all the perils and misfortunes of his fallen nature.

Here, then, began the conflict of the human paſſions, as violent and ungovernable as the elements themſelves. Here the toil and labour of the man, who ſhould *earn his bread by the ſweat of his brow,* and the tears and travail of the woman, who ſhould *conceive in pain and ſorrow,* had each their ſource. Here likewiſe, the dark catalogue of human infirmities, of diſeaſe and death, had its too early date; yet

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to this æra, which gave birth to our manifold misfortunes, muſt we look for that benign ſource of alleviation and cure, which the relenting hand of Providence has graciouſly afforded to thoſe who will ſeek for them; *for out of the ground hath the Lord cauſed medicine to grow; and he that is wiſe will not deſpiſe them; for with ſuch doth he heal men, and taketh away their pains.* Eccl. xxxviii. 4, 7.

Since, by his fall, man became ſubject to the elements, from them he receives the conſtitution of his body; but his reaſoning intellect, and ſpiritual ſoul, are derived from the pure eſſence or tincture of the Deity, originally infuſed into the ſeed of man. To the violence and impurity of the elements, we owe the diſorders of the body; to the temptations and allurements of the devil, we juſtly impute the diſeaſes of the ſoul. Yet by due attention to our reaſoning faculty, it is no hard taſk to preſerve health, or prolong life, to the term of its *natural* diſſolution; while, by the powers of the mind, and the light of the goſpel, we may ſtill avoid the poiſon of ſin, and become members of that eternal kingdom, which is the ſure reward of the good and virtuous.

The imperfections and diſeaſes of the body, therefore, beginning with Adam, are in conſequence tranſmitted to his poſterity; and may be divided into *heriditary* and *accidental.* Hereditary complaints proceed from a certain defect of the animal powers, or imperfect ſtate of the ſanguiferous ſyſtem, at the time of copulation. The accidental conſiſt of all ſuch maladies as are communicated by the diſcordant or putrid ſtate of the elements, not only during the time the child is encompaſſed in the womb, but from its birth to the lateſt hour of its exiſtence. And it might here be obſerved, that the increaſe or decreaſe of both hereditary and accidental diſeaſes, depends almoſt entirely on the purity or impurity of the blood. For, if pure, in both male and female, at the time of impregnation, the fœtus will be naturally ſtrong and healthful. So likewiſe, if after parturition, and during life, care be taken to keep the blood in an uncontaminated and elaſtic ſtate, we ſhall not only avoid the common effects of exceſſive cold, heat, and moiſture; but likewiſe that direful train of acute diſeaſes communicated by putridity and infection; or, ſhould they by chance attack us, the effect becomes ſlight and temporary. A circumſtance this, which ſurely ought to weigh perpetually on the minds of thoſe, who know how to value the bleſſing of health, or who would wiſh to live a long, an active, and a pleaſant, life. This is therefore a ſpeculation of that high importance, that I ſhall now ſhow how hereditary complaints are communicated in the act of copulation—how increaſed and foſtered in the womb—how accidental diſeaſes grow up and follow,—and how both theſe enemies to the health and happineſs of mankind may be prevented or overcome.

In regard to that union of the ſexes to which we are inſtinctively impelled, or rather in the union of thoſe eſſences or tinctures peculiar to the generative organs of male and

female, in the contact of which the firſt moments of human exiſtence commence, the moſt whimſical and abſurd theories have been ſet up. No branch of phyſiology has been more expoſed to cenſure and miſtake. While the phænomena of the heavens, of the earth, and even of the human mind itſelf, are traced with a ſteady hand, and with all the dignity of philoſophy, the functions of the human body, in health as well as under diſeaſe, though expounded with a profuſion of fantaſtical erudition, appear almoſt in as much doubt and darkneſs as in the days of Paracelſus.

Let us then proceed to review the mode by which generation is accompliſhed. I have, in the former part of this work, already explained the ſyſtems of Buffon and of Leeuwenhoek, in their ſpeculations on the animalcules found in the ſeed of man and in that of brute animals; I have alſo in the medical part of Culpeper's Engliſh Phyſician, ſhown the mode by which generation is performed, ſo far as relates to the action itſelf, and to its groſs effect. I ſhall now conſider it in a new light, as it concerns the propagation of ſoul and body, and of family-temper, likeneſs, and diſeaſe; but, as the female is ſo materially concerned in the myſterious act of impregnation, and in all its conſequences, I ſhall here take up the reaſoning of a late ingenious anonymous author, whoſe opinion exactly coincides with my own.

The extremity of the uterine ſyſtem, without the nymphæ, ſeems not, except from its aperture, and the laſcivious ſuſceptibility of its texture, materially requiſite to generation. Immediately within the nymphæ, the *vagina*, or great canal of the uterus, begins. Before coition has diſturbed its proportions, it is generally about five or ſix inches long; and when thrown into a circular form, without violent diſtention, its diameter is about a ſixth part of its length. But as, in coition, the vagina is the immediate receptacle of the penis, it is capable of great diſtention, and may be rendered of very conſiderable capacity. In general, however, after frequent contact, this canal becomes much ſhorter, but more proportionably increaſed in its diameter; yet, being contrived by its organization for the purpoſe of exciting pleaſure, it can and does accommodate itſelf to whatever ſize is neceſſary cloſely to embrace the penis in the act of copulation.

At the upper extremity of this canal, the uterus or womb is ſeated. It is of a pyramidal form, with its apex towards the vagina. Its greateſt length, in virgins, is not more than two or three inches; and its width is ſcarcely one; its internal cavity muſt therefore be very ſmall. It is connected to the vagina or great canal by a paſſage ſo ſmall, that a bodkin or ſtilet cannot be introduced without ſome difficulty. In the broad or upper extremity of the womb, the ovaria are ſeated. Their ſubſtance is ſpungy, and they contain an indefinite number of veſicles of a duſkiſh ſemi-tranſparent quality, the involucra of which are diſtinct, and ſimilar to the general

neral ſubſtance of the ovaria. Theſe veſicles are the *ova*, or eggs, which contain the rudiments of the fœtus, and which muſt abſolutely be impregnated with the male ſeed, before it can be poſſible for generation to take place.

Now it has been, and is, the common opinion, that, when venereal embraces take place, the whole genital ſyſtem of the male being thrown into action by libidinous fire and violent friction, by this exertion the ſemen is thrown with conſiderable vehemence from the penis, and is either forced through the mouth of the womb, and attracted by the ovaria; or, that it is received by the Fallopian tubes, and conveyed by them through a variety of convolutions, till by their fimbriæ they are conducted to the ovaria, in the manner I have already fully deſcribed in the medical part of Culpeper's Engliſh Phyſician; all which tedious and complicated proceſs is alleged to take place in the inſtant of coition.

Others again ſuppoſe, that the internal orifice of the womb becomes open and pervious during the exertion and enjoyment of copulation, and that the glands of the penis abſolutely paſs into the cavity of the womb, and eject the ſeed immediately upon the ovaria. To each of theſe theories there appear inſuperable objections. In refutation of the firſt, we need only obſerve, that the vagina, from its ſtructure, and from its organization in the act of venery, is diſpoſed ſtrongly, and in every part, to embrace the penis; and, as the glands muſt thereby be cloſely ſurrounded, although it reaches not in every perſon to the furtheſt limits of the vagina; the ſlight and momentary impetus of the ſemen will thus be very effectually reſiſted, if not totally ſubdued. If the penis be not of magnitude ſufficient to occupy the vagina to its full extent, the unoccupied ſpace muſt be ſomehow diſtended; and, let this vacuum be what it will, its reſiſtance muſt be effectual; and, if it is not diſtended, the power or preſſure which occaſions its collapſe, will over-balance the impetus of the ſemen. But ſuppoſing the virile member in all caſes to be ſo exactly proportioned as to occupy the whole length of the uterine canal, which however we know is not the caſe; yet from what principle ſhall we aſcertain that the ſeminal tube of the penis, and the apex of the womb, ſhall be made ſo exactly to correſpond as to become continuous? The ſemen, in the event of coition, is doubtleſs thrown out by the penis with ſome force; though this force will always depend upon the vigour of the male organs, and therefore muſt vary from the loweſt to the higheſt degree of vigour which theſe organs can be ſuſceptible of. But even allowing the glans penis and apex of the womb to fall into exact contact upon due penetration; and that the male ſeed is always ejected with conſiderable force from the penis, and the vigina to be no barrier to the progreſs of it; yet how is it to force its way into the cavity of the womb? The aperture which leads from the vagina or great canal into the

the womb, is in fact no aperture at all. During menſtruation, indeed, it is pervious; but even then it is only capable of admitting a very ſmall probe; and this is no argument that it is naturally, and at other times, pervious. How often too has this aperture been entirely blocked up by preternatural obſtructions, and conception nevertheleſs taken place? Inſtances of this have often occurred; and the preciſion and authority with which they are recorded by different practitioners, leave no room to evade the argument. Hence this mode of impregnation appears not only highly objectionable, but utterly impoſſible; having no correſpondence with the human ſtructure, or with the economy of Nature.

After what has been ſaid, it may appear idle to proſecute any farther refutation of the progreſs of the male ſeed by the Fallopian tubes, or through the mouth of the womb. But, as authors of the greateſt reſpectability have believed in its progreſs through the tubes, and tell us they have even ſeen it there; it may not be improper to enquire how far this is aſcertainable. The Fallopian tubes, through which the ſemen is ſaid to paſs, originate, by very minute perforations, through the fundus of the womb; and, increaſing rapidly in their diameters, their capacities, when dilated, may be about the third part of an inch where they approach the ovaria. Here, again, they ſuddenly contract, leaving only a very ſmall opening; while their main ſubſtance is ſtill continued, and is expanded into that plaited or jagged fringe called the fimbriæ, which is contiguous to the ovaria.* I ſhall now aſk by what law in Nature, by what effort of it, is the male ſemen to be conducted through this conical and convoluted canal? Can the ſemen now poſſeſs any active force, to introduce itſelf through the rigid perforations of this organ, and to overcome the collapſe of the tubes? The ſtimulating power of the ſemen muſt ſoon be loſt in a veſſel which it has not power to diſtend; and we cannot ſuppoſe it capable of acting in a direction completely oppoſite to what is the acknowledged office of the tubes. It muſt be by irritability that the ovum is conveyed into the uterus from the ovaria; and we know no veſſels in any part of the body whoſe action is double and contrary. This ſyſtem therefore favours of great improbability. But we are told, by ſome, that they have actually ſeen the male ſemen in its unaltered ſtate, lodged in the Fallopian tubes. Theſe ſagacious authors might as prudently have affirmed, that they had ſeen ſnow upon the canal in Hyde-park at Midſummer. They did not know, or did not chooſe to recollect, becauſe it made againſt pre-conceived opinion, that the human ſeed, when ſubjected to heat, eſpecially to ſuch a moiſt and natural heat as thoſe parts conſtantly afford, ſoon looſes its ſpiſſitude and

* See Medical Part of Culpeper, page 17, 89, 97, &c. where all the parts, both male and female, are anatomically deſcribed.

tenacity, and becomes very ſubtilly fluid, and almoſt colourleſs. Beſides, it is univerſally acknowledged, that a conſiderable part of the ſemen is almoſt always, immediately after coition, rejected by the female. When we attend to the many inſtances of credulity and impoſition in the theories of generation, we need not marvel at the aptitude and facility with which pretended diſcoveries creep into notice, and the ſolemnity with which they obtrude themſelves into ſyſtems.

All the foregoing arguments againſt the poſſibility of a pervious communication between the vagina and the uterus, are alſo concluſive againſt the ſuggeſtion, that the penis, in the act of coition, penetrates into the cavity of the womb. Nor is the aſſertion of thoſe who contend that this orifice, by the turgidity of the parts during coition, naturally opens and dilates itſelf to receive the male ſeed, marked with the leaſt degree of probability. How is this dilatation of the orifice to be effected? Though the whole uterine ſyſtem, during the venereal act, be rendered ſtiff and turgid by animal deſire and influent blood, yet it is more probable that this turgidity would rather compreſs than dilate the orifice; and the ſtructure and texture of the womb ſeem exceedingly unfavourable to ſudden dilatation by any means whatever. In an unimpregnated or virgin ſtate, the womb is ſo ſmall that its ſides coaleſce or adhere together, and it has no hollow appearance whatever, though, from the texture and elaſticity of its fabric, it may be thrown into a globular form, which will conſtitute a cavity. But in coition, with all its occult and uncommon phenomena, what charm have we left to overcome this coaleſcence, and form this cavity, by opening or ſeparating the membranous ſides of the womb? Will it here be ſaid that the forcible ejection of the male ſemen will effect this purpoſe; or that the ſtiff and turgid ſtate of the penis itſelf will force its way into the fabric ſo remote and delicate? Though females may entertain ſanguine ideas of theſe things, we muſt ſuppoſe the vigilant anatomiſt, toiling through the unalarming and chilly organs of the dead, ought to furniſh a more rational hypotheſis, whence to deduce the active principle and admirable proceſs of human impregnation.

Authors have been always eager to eſtabliſh the certainty of a conſiderable afflux of blood to the female organs, and conſequent turgidity during the voluptuous communication of the ſexes; and this has been a wonderful prop to many abſurd conjectures. This afflux, and conſequent turgidity, they ſuppoſe originates, like the erection of the penis, from the ſtrength of libidinous ideas, and other locally-irritating cauſes; and is intended by nature to induce a tenſion in the female organs, that the progreſs of the ſemen may thereby be facilitated. This tenſion, again, they ſuppoſe induces ſome kind of conſtriction, which is ſaid to ſupport the action of the different parts of the genital ſyſtem, but particularly of the Fallopian tubes. Theſe

tubes, it is ſaid, are remarkably diſtended, during coition, by the blood ruſhing into the numerous veſſels which creep between their coats, by which means they are erected, and their fimbriated terminations applied to the ovaria; and it is gravely added, that diſſections of gravid women, and the comparative anatomy of brutes, corroborate the opinion. Were it not for the ſerious reſpect with which this anatomical obſervation hath for a length of time been favoured, nobody ſurely would be at the pains of detecting the abſurdity. Allowing that this turgidity, with all its concomitant circumſtances, really happens in the *living* ſubject, how can it poſſibly exiſt in a carcaſe flaccid with death, and, as is always the caſe in a human anatomiſed body, where death muſt have taken place ſome conſiderable time before?

But this turgidity, though it ſometimes may happen, and yet in a degree very limited to what is alleged, does not always happen; and, when it really does take place, it ſeems rather to be the companion and promoter of libidinous gratification, than a principal and eſſential promoter of conception. To many women the embraces of the male are extremely, if not completely, indifferent; and to ſome they are abſolutely diſagreeable; yet even theſe women are prolific. There is no difficulty in ſuggeſting a very ſufficient and natural reaſon why the parts of the female directly ſubjected to the action of the penis, during the venereal congreſs, ſhould become turgid with influent blood, and ſometimes be conſtricted. Nature, though ſhe ſeems in general unfriendly to exceſſive luſt, ſometimes permits it; and theſe are the means ſhe ſeems to have appointed for heightening it. Beſides, it is proper that the animal inſtinct, which prompts the reproduction of the ſpecies, ſhould not be diſappointed in its gratification, however brutal theſe ſenſations and ideas may appear to the purified philoſopher. Theſe means then, however they may contribute to the mutual ſenſibility of the ſexes, in the voluptuous gratification of animal pleaſure, appear to have no real influence on the proceſs of generation, after the venereal congreſs has ceaſed; nay, we have reaſon to believe that their action or influence does not extend beyond the limits of the vagina, except in common with the reſt of the genital ſyſtem, even during that congreſs. If an afflux of blood to theſe parts were always to be attended with theſe effects, what violence muſt the ovaria be expoſed to by reiterated coition, and by every return of the menſtrual diſcharge? During the menſtrual afflux, a very conſiderable diſtenſion muſt ſurely take place over the greateſt part, if not the whole, of the genital ſyſtem; and, as this turgidity is the principal reaſon aſſigned for the action of the tubes, by what means are the fimbriæ diverted from exerciſing thoſe functions which turgidity, though from another cauſe, at another time ſo ſucceſsfully inſtigates? Alſo, how happens it that grateful copulation is not always productive, and the contrary; that the fimbriæ, in every

every venereal act, do not operate upon the ovaria, and thereby produce more fœtuſes, or a waſte of the ova? and that the organs themſelves are not incapacitated, or diminiſhed in their energy, by ſuch repeated exertions? We have every reaſon then to conclude, that the tenſion and conſtriction of the female organs, induced by the afflux of blood during coition, if of conſequence, are intended ſolely to promote animal gratification; and, that they have no direct influence on the actual progreſs of the ſemen through the above-deſcribed communications to the ovaria.

Upon the whole, it is certainly no ways equivocal, that the ſemen cannot, in any manner, be applied to the ovaria by means of the fimbriæ; that it cannot aſcend or advance through the convolutions of the Fallopian tubes; that it cannot divaricate and traverſe the compreſſed uterus; and that it cannot even operate a paſſage through the rigid bulwark of the cervix uteri. The probability of the progreſs of the *aura ſeminalis*, through the ſame paths, is deſtroyed by the ſame arguments; and the whimſical opinions founded on the preſence of animalcules in the ſemen, and on the organic bodies furniſhed by the ſemen of both ſexes, and, uniting in the uterus, as far as this alleged aperture is concerned, muſt ſtand or fall by the ſame fate. It may ſeem however ſtrange, that a doctrine ſo ancient, and ſo univerſally believed, ſhould be ſo eaſily overthrown; and it may furniſh, to the ſpeculative reader, unfavourable ideas of the preſent ſtate of medical literature. He may indeed wonder, that, while every ſcience has become rational and reſpectable by the exertions of their cultivators, medicine alone has been able to reſiſt the diligence of a thouſand years; although it has been wreſted from the hands of nurſes, and its profeſſion become dignified and lucrative, it can ſcarcely be ſaid, at this day, to afford one unqueſtionable idea. In the volumes of phyſiology, compiled by the moſt learned phyſicians, and drawn from the moſt learned ſources, will the unconcerned philoſopher find the dogmata of medicine conſiſtent with Nature, or with common ſenſe?

But ſince the ſemen, in ſome ſhape or other, contains that animating principle which is indiſpenſably neceſſary to generation; and ſince the ovaria as indiſputably produced ſomething from whence a living creature is to be evolved, it becomes demonſtrably clear, that the influence of the male ſeed muſt be powerfully incorporated with the female, and directed to the ovaria, before this effect can poſſibly take place. We have already ſeen how this cannot happen; let us now endeavour to point out a rational medium by which it may be accompliſhed. For this purpoſe we muſt again return to the vagina, or canal of the uterus, as being the principal organ, on the part of the female, which actually contributes to propagation; and without the full and complete uſe of which, impregnation cannot take place. It therefore demands a very minute and attentive inveſtigation.

The vagina is elaſtic, and ſomewhat membranous, compoſed of muſcular fibres, blood-veſſels, nerves, and lymphatics. It commences from beneath, at the nymphæ, and, riſing obliquely about five inches, is loſt upon the uterus. Its capacity is very different in different ſubjects, and in no very diſtant periods of life in the ſame ſubject. A very reſpectable anatomiſt finiſhes his deſcription of it by ſaying, it is *membro virili ſecundum omnes dimenſiones accommodabilis.* Its inner membrane, though very uneven, is delicately ſmooth, and, from its nervous texture, exquiſitely ſenſible; the outer membrane is more ſpongy and muſcular; and, the whole body of the canal is very plentifully ſupplied with blood-veſſels, nerves, and lymphatics. We know little more of the lymphatics of theſe parts, than that they are more numerous proportionally than in any other part of the body. Thoſe which originate in the exterior parts of the female genital ſyſtem, traverſe the inguinal glands, while the deep-ſeated ones take a much more direct courſe to their place of union with the lacteals; but of theſe we ſhall be more particular, when we adduce our obſervations in favour of a very powerful *abſorption* ſubſiſting in the vagina.

The entrance into the canal of the uterus from without, is guarded by the nymphæ, which form an eminence on each ſide, ſo peculiarly conſtructed and arranged, that we muſt think lightly of the phyſiologiſt who could ſuppoſe them to be only appendages in office to the urethra. Indeed, as Nature frequently operates more than one end by a particular ſtructure, we ſhall not pretend to limit the ſecondary or inferior offices which the nymphæ may promote; but we ſee much reaſon to believe them created to aſſiſt powerfully in preventing the ſpeedy eſcape of the male ſemen, and thereby expoſing it longer to the action of the abſorbent ſyſtem. A multitude of circumſtances corroborate this belief; and it will not be impaired by the allegation, that theſe ridges by no means conſtitute a regular and complete valve. Immediately within this barrier, a ſtructure, on the ſame principles as thoſe of the nymphæ, but more elegant and powerful, commences; and it is continued over the ſurface of the vagina, gradually growing finer, till it is loſt in ſmoothneſs near the upper extremity of the canal. This ſtructure is the rugæ of the vagina, ſo accurately drawn and deſcribed by Haller and others; but degraded by ſome anatomiſts, who mark it only as uſeful in exciting venereal enjoyment, or admitting expanſion during coition and parturition. It is inſinuating a mean and diſgraceful reflection on the important order and operations of Nature to ſuppoſe, that theſe rugæ, which are not caſually arranged, but are regulated with as much preciſion and uniformity as we can trace in any other part of the genital ſyſtem;—I ſay it is nugatory and preſumptuous to aſſert, that this intricate, extenſive, and beautiful, arrangement, has been ſo minutely laboured for no other purpoſe, but merely to excite

excite a greater titillation during the groſs and libidinous commerce of the ſexes, and a greater extenſion during parturition. This ſtricture may indeed promote theſe ſecondary purpoſes; but it is intended for much nobler ends. Had theſe rugæ been conſtructed merely for ſimple contraction and dilatation, they would have covered equally the whole ſurface of the vagina, which certainly does not happen; neither, if theſe had been their principal uſes, would they be ſo ſoon and ſo eaſily obliterated. We believe, then, that the rugæ of the vagina are thus contrived principally to protract the ſemen in that viſcus after the penis is withdrawn, and thereby to favour *abſorption;* eſpecially as the qualities of the ſemen coincide wonderfully with theſe intentions.

The ſemen, as it is ſecreted from the blood in the teſticles, is very different from that heterogeneous mixture which is expelled by the urethra in coition; though, by the alteration, its fecundating quality is not improved. When it is conveyed into the veſicles, it is of a thin conſiſtence, of a pale yellowiſh colour, and little in quantity. In theſe veſicles it is ſomewhat inſpiſſated, and its colour heightened; and, after it is mixed with the liquor of the proſtrate glands, it becomes ſtill thicker, and of a more whitiſh colour. This conſiſtence which the ſemen acquires in its progreſs from the teſticles, may produce other ſlight properties; but the principal intention of it ſeems to be, to correſpond more effectually with the abſorbent power of the vagina: for thus, by the increaſed tenacity of the ſemen, the remora of its fecundating part muſt be protracted in the vagina, while at the ſame time the abſorbents are allowed more time to attack thoſe active ſubtile parts intended to be carried into the circulating ſyſtem. We may add here, in order farther to confirm the opinion concerning the uſe of the tenacity of the ſemen, that, when too little of this mucilage is derived from the glands, or when it is of a depraved or thin quality, the whole mixture eſcapes the machinery of the vagina too rapidly, and hence coition becomes unproductive. This is the ſeminal feroſity, as it is called, held to be one of the few cauſes of ſterility in man. And we may add farther, that, when the conſent and power of procreation begins to fail on the part of the woman, the crenulations of the vagina are then always viſibly decayed, whether affected by the advances of age, or by imprudently-reiterated venery. But what are we to think of a very reſpectable author, who gravely tells us, that the ſemen, by ſtagnation, and by the addition of the cream-like liquor of the proſtrate glands, is better ſuited to the projecting effort of the urethra in the event of coition? Indeed, it is not to be denied, that the increaſe in quantity of the ſeminal mixture may enable the projectile power of the urethra, with its aiding muſcles, to act with greater efficacy; but a boy would laugh in my face were I to tell him, that by adding to the

weight and tenacity of water, his ſquirt would throw it much farther. To act in concert, then, with theſe unqueſtionable qualities of the ſemen, the ſurface of the vagina, by means of its rugæ, from their elevation and arrangement, muſt have a very conſiderable effect in heightening the remora we have deſcribed. No doubt, if Nature had only had in view the prevention of the regreſs of the ſemen, we might have met with a much ſimpler mechaniſm; but, as to this part very different offices, and all of them material, were allotted, it has been intricately qualified for them all.—Thus, upon the whole, we ſee an admirable diſpoſition in the ſemen, and in the ſurface of the vagina, to facilitate and promote the action of the abſorbent veſſels.

Though the *abſorbent ſyſtem* has not been traced with the ſame minuteneſs and ſucceſs which have followed the inveſtigation of the ſanguiferous ſyſtem, it is however known to be very general, and very powerful; and it is remarkably ſo in the cavity of the pelvis. How, otherwiſe, is that effuſion which is conſtantly going on, in order to lubricate the whole genital ſyſtem in the female, and to prevent the coaleſcence or concretion of its ſides, reſumed? In thoſe unfortunate females whoſe menſes have taken place, but in whom likewiſe the expulſion of them has been prevented by the unruptured hymen, or by unnatural membranes blocking up the paſſage, much of the blood has always been reſorbed; and in thoſe whoſe diſeaſe has exiſted long, and where the thick parts of the blood have begun to be broken down, the colluvies has been reſorbed, and a train of ſymptoms induced, not to be accounted for by the mere turgidity which this obſtruction occaſioned. The infection and progreſs of ſyphilis or confirmed lues, not only eſtabliſh the certainty of a very rapid and powerful abſorption in the vagina; but alſo exhibit the power and influence of the irregularities of its ſurface. It is ſurely very evident, that the chief application of the venereal virus, whether in gonorrhœa or ſyphilis, but eſpecially in gonorrhœa, muſt be near the farther extremity of the vagina, though there can be no doubt but the ulcerated glans may often affect the exterior parts by its introduction; but, in a confirmed lues, the fundus of the vagina is rarely the ſeat of ulcer, and it is never affected in gonorrhœa. Here, the ſurface of the vagina being moſtly ſmooth, the poiſon runs downwards, till falling upon the rugæ, it is there intercepted and retarded. Here then the poiſon is multiplied, and leiſurely applied to the mouths of the lymphatics, through which it is carried into the blood; where, aſſimulating together, it contaminates the whole maſs. Though the progreſs of the ſyphilitic poiſon is not always thus regular, the variations do not affect the opinion. When the lymphatics, and their glands, are vigorous and eaſy permeable; when the application of the venereal virus is within the nymphæ; and, when it is ſufficiently active, the firſt ſymptoms of diſeaſe ariſe from general contamination;

and,

and, were this poiſon always very mild, and taken up by the abſorbents within the nymphæ, there is no doubt but the whole maſs would almoſt always be diſeaſed, without much chance of ulcer or preceding bubo. But there are many circumſtances which tend to retard the ſpeedy abſorption of the ſyphilitic virus, even when it is extremely active; and, among theſe, the inflammation which in general it muſt induce, is not perhaps the leaſt conſiderable; but theſe cannot affect the abſorption of the ſeminal fluid of the male. The ſyphilitic virus too, may, from the laxity and lubricity of the vagina, (a circumſtance very general in immodeſt women,) not only eſcape abſorption, but may be carried outwards, to exerciſe its energy on the external parts. And it is from theſe reaſons partly, that immodeſt women are ſo little diſpoſed to conception, and that modeſt women, when ſubjected to venereal infection, generally experience the more latent and violent ſpecies of this diſeaſe. And, as a greater ſurface of abſorbents is expoſed in the female to the contaminating influence of the diſeaſed male organs, and as the greateſt part of the female genital ſyſtem has a much readier intercourſe with the blood than through the inguinal glands, we meet with this ſpecies of ſyphilis much oftener in women than in men. The cure of ſyphilis, too, by ſpecific remedies introduced into the vagina, fully demonſtrates the ſtrength and activity of the lymphatics in this canal. Is there then a ready and eſtabliſhed communication, for diſeaſe, and for its remedies, between the vagina and the general circulating ſyſtem of the blood, while a mild fluid, yet poſſeſſed of activity infinitely beyond that of any poiſon, and created for the higheſt and beſt of purpoſes, is not permitted to traverſe the ſame channels? Many other corroborating circumſtances, both in fact and in analogy, might be adduced here, were not theſe arguments in themſelves concluſive.

In a due ſtate of health there is what may be called an inteſtine motion in the blood, occaſioning and promoting its commixture, as well as its ſeparation. In all general diſeaſes, and even in many which are called local, this inteſtine motion is heightened, diminiſhed, or deranged; and in the exanthematous or eruptive diſorders, it muſt be remarkably ſo. In ſyphilis, though this diſeaſe is not directly exanthematous, there muſt be exceſſive diſturbance, and certain depravation, prevailing throughout the whole ſyſtem, before ſuch complete deſtruction can be brought upon it. In theſe caſes of diſeaſe, where vehement infection, with all its conſequences, is overturning all before it, we have always found, that milder infections could make no impreſſion. Hence the practitioner never heſitates to ingraft the ſmall-pox, though the patient may have already received the diſeaſe, either by natural contagion, or by prior inoculation: hence a milder diſeaſe is often removed by a ſeverer one; hence ſlow conſumption is always retarded, and often overcome, by fecundation;

tion; and hence fecundation itſelf, as the feebler ſtimulus, is often prevented by the anticipating diſturbance of ſyphilis, or of ſimilar diſeaſes vehemently pre-occupying the circulating ſyſtem. It is this anticipation, this prior poſſeſſion, and change in the circulating blood, which reaſonably and emphatically accounts for the want of influence in the human ſemen upon the female after impregnation has fully taken place, or while the mother is providing milk. And we might account for the production of twins, triplets, and thoſe rare inſtances of more numerous progeny, from the ſame circumſtances. One, two, or more, ova may indeed be ſo ripe as to meet completely the fecundating impulſe of the male ſemen at one time; and it is perhaps more ſtrange that the different fœtuſes ſhould be maturated and expelled about the ſame time, than if a greater period intervened between the expulſion of each; and might not a ſecond intercourſe of the ſexes be ſucceſsful, when the female circulating maſs was not fully pre-occupied by the influence of the firſt? But the extent and influence of prior infection, or impregnation of the blood, has been better obſerved in the venereal than in any other diſeaſe, or natural occurrence. Women, whoſe general ſyſtem is vitiated by the ſyphilitic virus, are always incapable of conception; or if the vitiation is not complete, but in a ſlight degree, an imperfect fecundation may take place; but its product determines the want of energy, and the unqualified ſtate of the mother, from whence it drew its principal arrangement. Theſe ideas are corroborated by the mode of cure adopted in the circumſtances we have been deſcribing, and by the general effects of it.

Thus we have endeavoured, and we hope with ſucceſs, to eſtabliſh the truth of a ſtrong power of abſorption in the genital ſyſtem of the female, originating in the vagina; and a diſpoſition in the whole maſs of blood, to be affected according to the properties of what may be mingled with it. And as, from the preſent ſtate of anatomical knowledge, we have no right to ſuſpect any other mode than this of abſorption, by which the unrejected and finer parts of the ſemen can in any ſhape, and with any effect, be determined towards the ovaria, let us ſee how this can be farther aſcertained by what we may ſuppoſe to be the effect of the abſorbed ſemen, and the future appearances of impregnation.

In human creatures the evolution of all their parts is gradual, and the work of time. From the moment in which the ovarian nucleus receives the vivifying impulſe from the ſemen, till the period of puberty; from the dawn of its exiſtence, to the completion of its figure and its powers; its alterations are ſo many, and ſo varied, that our idea of the germ is not recogniſable in that of the infant, and our idea of the infant again is loſt in that of the perfect animal. A gelatinous particle, without neceſſary form and texture, becomes a ſtupendous fabric, ſo intricate and elaborate, though at the ſame time perfect and complete, that human ingenuity

and reaſon have toiled almoſt fruitleſsly for thouſands of years in inveſtigating the progreſs. It has indeed been averred by ſome, that all the different organs of the animal in its complete ſtate are original and diſtinct in the embryo, and are only unfolded and rendered more evident by its increaſe. This ſurely is not the caſe. The animal is certainly endowed with power of completing itſelf; and can, from inorganized parts, produce an organized ſtructure. The parts are only evolved and perfected as they become uſeful in the different ſtages; and the evolution of many of them can be prevented without the deſtruction of life, or exceſſive prejudice to thoſe already evolved. If the different organs, or rather principles, are at firſt perfect, why are thoſe effects which depend upon them not perfect alſo? Why is the ſtate of infancy a ſtate of idiotiſm? why is the temper of youth capricious and flexible? and why are the temper and paſſions of the adult but barely diſcernible in the preceding ſtages?

As we are of opinion then, that the different organs are matured only as they become requiſite and neceſſary, conſequently, we believe the evolution of the generative organs in both ſexes muſt be among the laſt efforts of the increaſe and completion of the body. This evolution could not have taken place earlier: if it had, the mind muſt have been affected by thoſe impulſes which announce the maturation of theſe organs, by which we know the mind, body, and ſoul, are connected. In the male, the foundation and powers of maturation, of that ſtrength, and of thoſe more rational qualities which belong to him, are laid to ripen with puberty: hence communication with the female, before theſe are finally arranged and ſecured, proves inefficient, and entails upon him debility both of body and mind. The ſame thing holds, as far as the ſame ends are concerned, with reſpect to the female; and we cannot ſuppoſe that Nature could be ſo idly eccentric, as to puniſh the female with a diſpoſition or propenſity to procreate, before the body was capable of undergoing the various diſorders and dangers of pregnancy and parturition. For the ſame reaſons, none of the ordinary organs of ſenſe are qualified to receive or communicate diſtinct impreſſions, till the brain, the ſeat of the ſoul, as the heart is of life, has acquired thoſe properties which muſt fit it for its arduous offices. It is only when the different organs of ſenſe have been completely evolved, and all their parts ſound and juſt, that the power of the mind is effectuated and eſtabliſhed. This faculty, though it ſeems eſſentially different from Reaſon, is no doubt the origin of it; for the extenſion of common ſenſe, from memory, or rather from compariſon, and what may be called the balance of the ſenſes, conſtitutes what is called Reaſon and Judgment. While the organs are incomplete, from infancy or from diſeaſe, their communication with the underſtanding is alſo incomplete. Thoſe who have been born blind, or whoſe eyes have been deſtroyed in infancy before they were

become uſeful, have none of thoſe ideas which depend upon the eye; it is the ſame with the deaf, and in all caſes of ideas depending upon one ſenſe: and we may add, the early caſtrated have no comprehenſion of, or propenſity to, the gratification of love. Do not theſe things ſhow—and a thouſand other circumſtances might be adduced to ſtrengthen the proof—that the mind acquires its powers only as the parts of the body are unfolded, and confirmed; that the body is perfected only as the mind is qualified to receive its impreſſions; and that the parts of the body are perfected by one another?

During infancy and youth, ſtrictly, the ovaria are ſimple inorganic maſſes, partaking of no more life than is barely ſufficient to ſuſtain them, and connect them with that energy and progreſs of conſtitution which are afterwards to unfold all their properties. At the period of puberty, thus denominated from the change which takes place in the genital ſyſtem at this time of life, this progreſs and developement of the ovaria is finiſhed by Nature; and thoſe bodies are generated and completed within them, which will exiſt without impregnation by the male, but which this impregnation alone can finally maturate and evolve. That theſe bodies are not generated at an earlier date, Anatomy as well as Reaſon, founded on the foregoing arguments, aſſure us; and, that the ova of all the fœtuſes, which the female is afterwards to produce, are generated at that time, ſeems equally certain. Though this change in the ovaria is the moſt eſſential, the whole genital ſyſtem alſo undergoes a very material change. The ſimple alterations of ſtructure and dimenſions in the different parts of this ſyſtem, though they are neceſſary and ſubſervient to generation and parturition, yet they are not ſo material, either in themſelves, or to our purpoſe, as to require a minute deſcription. This, however, is not the caſe with reſpect to the menſes. It is chiefly with a view to the nutrition of the fœtus that the extra-ſanguification in the female is provided by Nature; which is determined to the genital ſyſtem, in the ſame manner as the other fluids are determined to other outlets; but, as the continued drilling off of this extra blood would be exceedingly inconvenient and diſguſting, Nature has prepared, as it were, a ciſtern for its reception. What may be ſufficient to bring on the hæmorrhage, however, is only accumulated; and the general redundancy, induced by the obſtruction and accumulation, ſubſides gradually as the hæmorrhage goes on. This is the manner of menſtruation in the unimpregnated female, and theſe are the reaſons why it aſſumes a periodical form. In the impregnated female again, the preparation of extra blood ſtill continues, but its conſumption becomes very different. By the extenſion of the uterus, and by the waſte occaſioned by the nouriſhment of the fœtus and its involucra, the ſurcharge or extra-preparation of blood is nearly balanced, or is taken up as it is prepared; and hence the periodical efforts are almoſt loſt. In the firſt months

of

of pregnancy, however, the uterine ſyſtem is not always able to conſume the ſurcharge of blood, and thereby take off the periodical effort; and hence it is that the loſs of the fœtus happens moſt generally in the early months, and at the uſual period of the menſes, unleſs ſome accident has ſupervened. And it is nearly from the ſame reaſons that miſcarriage is ſo often to be apprehended in the latter months of pregnancy, and that the fœtus is afterwards expelled from the womb. When the fœtus has acquired all that bulk and ſtrength which the capacity and powers of the uterus can confer, and when a change of circulation and mode of life becomes neceſſary to it, the uterus and fœtus become plethoric; a general accumulation ſucceeds; and the periodical efforts of the menſes return. During the middle months of pregnancy the fœtus is in a ſtate of rapid growth, and is capable of conſuming all the blood which the mother can furniſh; but there is neither room nor waſte, in the latter months, for the blood which the mother is conſtantly pouring in; and hence ariſes that plethora, both in mother and child, which is to inſtigate the effort to parturition, which occaſions the effuſion after parturition, and which is to ſupply the extended circulation of the born child.

But, beſides the utility of menſtruation to the fœtus, there is a very evident connection between it and impregnation. To ſpeak of it as a proof of the ripened qualifications of the female, is to ſay nothing; its immediate action is eſſential to conception. In the human female, it is well known that coition is almoſt only ſucceſsful immediately after this evacuation has ſubſided. Who will reconcile this—and it is no modern and groundleſs obſervation—to the conſequence which has been aſcribed to turgidity and tenſion, which we have already adverted to? Almoſt every woman who has frequently undergone pregnancy, and who has attended judiciouſly to the phænomena of that ſituation, calculates from the laſt ceſſation of the menſes. At this time, or rather very ſoon after it, the plethoric tumult of the general ſyſtem has completely ſubſided, and the abſorbed ſemen gets quiet and unanticipated poſſeſſion of the circulating blood; and at the ſame time the gradually-returning plethora promotes its action, and perhaps its determination to the ovaria. When the menſes are interrupted, or profuſe and frequent, impregnation ſeldom takes place; and it admits not of a doubt, that, when the determination of this blood is towards the mammæ, in the form of milk, coition is unſucceſsful; and, as ſoon as its determination to the urine ſyſtem is reſtored, other things being favourable, copulation ſucceeds. We may add as a known fact, that continuing to give ſuck after the uſual period will occupy the plethora, and prevent its determination, in the form of blood, to the uterine ſyſtem; and this practice has often been had recourſe to, in order to prevent conception. Sometimes there is reaſon to believe that conception has taken place

while the plethoric determination to the breaſts continued. I am rather diſpoſed to believe, that in ſuch caſes its return to the uterine ſyſtem had re-commenced; for about the ſame time the milk generally loſes its alimentary qualities, and gradually dwindles away.

But we have ſaid enough to deſcribe and ſubſtantiate thoſe parts of the female which puberty has prepared for generation. We ſhall now conſider its effects on the male. It need not be repeated, that the ſeminal fluid is an exceedingly penetrating and active fluid. Its effects, after it is generated, even upon the male, demonſtrate its activity and influence, far beyond the precincts wherein we believe it to be accumulated. After puberty, the ſecretion of it, during even indifferent health, is continually going on; and thoſe collections of it in its reſervoirs, which are not thrown out by venereal exerciſe, or by other means leſs decent, are reſorbed and mingled with the general maſs. What is actually reſorbed about the period of puberty, before the ſyſtem has been habituated to it, or ſaturated with it, produces very curious and remarkable effects over the whole body. The fleſh and ſkin, from being tender, delicate, and irritable, become coarſe and firm; the body in general loſes its ſucculency; and a new exiſtence ſeems to take place. The voice, a proof of the tenſion and rigidity of the muſcular fibre, loſing its tenderneſs and inequalities, becomes ungratefully harſh; and the mind itſelf, actuated by the progreſs of the body, and forgetting all its former inclinations and attachments, acquires diſtinctly new propenſities and paſſions. Theſe changes are not entirely the effect of ordinarily-progreſſive age and ſtrength; neither are they promoted by intercourſe with the world; for caſtration will anticipate them, and premature venery, or even gradual familiarity, and early onaniſm, will diminiſh them. Boys who have been ſubjected to caſtration never acquire either that ſtrength of body or capacity of mind which dignifies the complete male; and the ſame cruel and unnatural operation performed on brute animals, diminiſhes their bodily ſtrength, their courage, and the fierceneſs of their temper.

If ſuch are the effects of the ſeminal fluid when reſorbed by the male, how powerful muſt it be when ſuddenly mingled, and moſt probably in greater quantity, with the circulating fluids of the attracting female! Coition, or rather the abſorption of the ſeminal fluid of the male by the female, even when not ſucceeded by impregnation, induces an alteration very general over the female ſyſtem. The local influence of which may be inferred from the general change which it is capable of inducing during complete health; from the relief which it effectuates in many ſpecies of diſeaſe; and from the general vivacity and cheerfulneſs diffuſed over the whole animal frame. It would be prolix to go over every diſeaſe which will warrant theſe opinions; yet, in the eye of common obſervation, the ſallow and inanimate female,

female, by coition, often becomes plump and robuſt, and beautiful and active; while the widow, or married woman deprived of commerce with her huſband, gradually returns to the imperfections and peculiarities of ſingle life; and that the ancient virgin, all her life deprived of this animating effluvium, is generally conſumed with infirmity, ill-temper, or diſeaſe. It is well known, too, that the want of coition at the time of life when Nature ſeems to require it, induces many diſorders in females; and that the uſe of it removes theſe, and even other diſeaſes. Chloroſis, or the whites, almoſt always attack females immediately after puberty; and, even when the violence of its ſymptoms have not been diſcerned till a later period, its origin can always be traced back to that time. When the human ſyſtem is completely evolved, and all its parts have acquired their full growth, a balance is produced between the circulating and ſolid ſyſtems; though, from the ideas we have ſuggeſted concerning the menſes, this balance in the female cannot ſtrictly be called complete. It is only complete in her when in perfect health, and in an impregnated ſtate; at other times, the catamenia, as preponderating againſt the powers of the ſolid ſyſtem, in proportion to the degree of their period, diſturb the equilibrium, and thereby more or leſs induce a ſtate inconſiſtent with perfect health. But, when the propelling power of growth has ceaſed before the ſolids, either from actual diſeaſe, or want of uniformity in either period, or acceſſion with reſpect to the progreſs of the circulating ſyſtem, have acquired their proper vigour and tone; and when the catamenia has aſſumed its deſtination before it is accompanied by the general as well as local energy which is requiſite to expel it, an univerſal want of balance comes on; the blood loſes its ſtimulating influence on the vitiated ſolids, and theſe, in their turn, act feebly on the diſtempered blood. Accordingly, in the cure of this diſeaſe, no matter whether adopted from particular theories or from experience, medicines are directed to reſtore vigour to the ſolids, and conſiſtence and ſtimulus to the circulating maſs. Nature proceeds in the ſame manner; and the beneficial effects of coition in the cure of this diſeaſe have been too material to eſcape obſervation. It may be alleged, that theſe effects depend entirely upon local influence; and that even voluptuous gratification, by quieting the turbulence of paſſion, is of conſequence in the cure. We ſhall not ſay that theſe things are unavailing; for it appears that the relief obtained is chiefly owing to the increaſed inteſtine motion, and conſequent ſtimulus, communicated to the blood by the abſorbed ſemen, whereby the ſolids themſelves are ultimately reſtored; and we are the more confirmed in this opinion, becauſe all theſe fortunate effects attend, whether coition be ſucceeded by impregnation or not. Hyſterics, and other diſeaſes, would furniſh us with ſimilar explanations and ſimilar cures.

Let us now advance a little nearer our object. It is beyond a doubt, that, in whatever manner the ſemen acts upon the female, it does not act ſuddenly, notwithſtanding the general aſſertions of many authors. However productive coition may be, the fecundated product of the ovaria is not immediatelydiſengaged. We dare not avouch this fact from obſervations made on the human ſubject, becauſe ſuch obſervations never have been attempted, nor ever can with the ſmalleſt probability of ſucceſs: but the diſſection of brutes, by the moſt eminent anatomiſts, with a direct view to the elucidation of this fact, aſcertains it as far as ſuch evidence can be admitted. In the diſſection of ſmall animals by De Graff, he found no diſcernible alteration in the uterus during the firſt forty hours after coition, but a gradual change was perceivable in the ovaria; and what he ſuppoſed the ripened origin of the future animal, at the end of that time, loſing its tranſparency, become opaque and ruddy. After that time, the fimbriæ were found cloſely applied to the ovaria; the cavities from whence the ova had been expreſſed were diſcernible; and about the third day the ova were diſcovered in the uterus. In large animals, and in thoſe whoſe time of uterine geſtation was longer, it was found that the progreſs which we have been deſcribing was proportionably ſlower. The ſame experiments have been made by different anatomiſts, and perhaps with very different views; and, though they have not always been managed with the ſame judgment and dexterity, yet all of them more or leſs confirm the idea that there is a very conſiderable lapſe of time intervening between productive copulation and the expulſion of the ovum from the ovaria. But, if this be the caſe with animals which ſoon arrive at puberty, and which, like human creatures, copulate not perfectly before puberty,—whoſe lives are ſhort, and their progreſs in equal periods of time more rapid than thoſe in man,—by parity of reaſon, it muſt happen, that in women the period between impregnation and the expulſion of the fecundated product of the ovaria muſt be conſiderably greater than what has been obſerved to take place in theſe animals. If all this is true—how are we to ſuppoſe Nature to be employed during this interval? We believe it is during this period that the whole female conſtitution is labouring under the fecundating influence of the ſeminal fluid taken into the blood by the *abſorbents;* while the ovaria are largely participating, and their product ripening, by means of the general ſtimulating proceſs. And the ſame proceſs which maturates the ovum tends to facilitate its excluſion. The ovaria, as well as their product, are at this time enlarged, and other changes, ſubject to the examination of our ſenſes, induced. It is no proof againſt the reality of this general alteration in the circumſtances of the circulating ſyſtem, and conſequent revolution in the ovaria, that the whole is accompliſhed with but little viſible diſturbance, either local or univerſal. In other

caſes of material alteration in the maſs of blood, equal quietneſs and obſcurity prevail. In ſcrophulous or ſcorbutic taints; in the inoculated ſmall-pox, or when they are produced by contagion; the poiſon ſilently and ſlowly diffuſes itſelf throughout the whole maſs, and a highly-morbid ſtate is imperceptibly induced. Thus, an active and inſinuating poiſon intimately mixes itſelf with all the containing, perhaps, as well as contained, parts, perverts their natures, and is ready to fall upon and deſtroy the very powers of life, before one ſymptom of its action or of its influence has been diſcerned. It is the ſame in a confirmed lues, and it is even more remarkable in the hydrophobia derived from the bite of a mad dog; and the whole round of contagious diſeaſes have the ſame unalarming, yet certain, progreſs and termination.

That the final influence of this elaborate proceſs ſhould be determined particularly, and at all times, to the ovaria, is no way marvellous. To qualify the ovaria for this, they are ſupplied with a congeries of blood-veſſels and nerves, at puberty larger and more numerous than what is allotted to any other part of ſimilar magnitude. Were the ovaria merely a receptacle for the ova, which the venereal orgaſm communicated by the nerves, or by the impulſion of the applied ſemen, was to lacerate; what uſe would there be for ſo intricate and extenſive an arrangement of blood-veſſels and nerves? But we may farther remark, that every diſtinct proceſs in the human body, either during health or diſeaſe, tends to one particular and diſtinct purpoſe. The kidneys do not ſecrete bile, nor does the liver ſtrain off the uſeleſs or hurtful parts of the blood which are deſtined to paſs off by the emulgents; neither do the ſalivary and bronchial glands promiſcuouſly pour out mucus or ſaliva; the variolous virus does not produce a morbillous eruption, ſyphilitic caries, or ſcrophulous ulcer; why then ſhould the fecundated blood unconcernedly and promiſcuouſly determine its energy to the ſkin, the lymphatics, or the ſubſtance of the bones? We know none of the operations in the human body, deſtined for the ordinary purpoſes of life and health, or for the removal of diſeaſe, but in a greater or leſs degree involve the machinery of the whole ſyſtem. A ſingle mouthful of food, while it is prepared, purified, and applied to its ultimate purpoſes, is ſubjected to the action of all the known parts of the body, and without doubt to all thoſe parts the properties of which we are unacquainted with; a draught of cold water ſpreads its influence almoſt inſtantaneouſly from one extremity to the other; the ſlighteſt wound diſturbs even the remoteſt parts, and is followed, not unfrequently, with the moſt unhappy effects; an almoſt inviſible quantity of poiſon ſets the whole frame in torture, and all the active powers of the body inſtinctively exert themſelves to ſolicit its expulſion.—Can we diſtinguiſh theſe things, and admire them, and then

ſuppoſe

ſuppoſe that the moſt material operation of the human body—the renovation of itſelf—is to be accompliſhed in a corner, and with infinitely leſs formality and ſolemnity than a ſpittle is caſt upon the wind? The evident means are ſufficiently degraded; we need not exert our ingenuity to degrade them farther.

It is during this interval, between productive coition and the excluſion of the ovum from the ovaria, that likeneſs, hereditary diſeaſes, and the like, are communicated and acquired. Inſtead of that influence which the imagination of the mother is ſuppoſed to poſſeſs over the form of the child, might we not ſuſpect, that the ſeminal fluid of the male, co-operating, *during this interval*, with the influence of the female upon the ovum, inſtigated a likeneſs, according to the influence of the male and female tinctures, in the united principles? It is during this period only that the diſeaſes of the male can be communicated to the child; and, if we admit not of this interval and general operation of the ſeminal fluid, we cannot ſee how they can be communicated, though thoſe of the mother may be communicated then or at a much later period, conſidering how the child is nouriſhed while it is in the uterus and at the breaſt. It may be urged againſt this early and effectual acquiſition of likeneſs, that the fœtus does not acquire even the diviſion of its largeſt members till long after its excluſion from the ovaria: but then we are confident, that, as the fœtus takes all its form and other properties from the active ſubtilty of theſe blended tinctures, we cannot ſee any reaſon why it ſhould not poſſeſs this hereditary faculty, in common with the reſt. If likeneſs depend upon the imagination of the female, how happens it that the children of thoſe whoſe profligate manners render the father uncertain, and whoſe affections ceaſe with the inſtant of libidinous gratification, are as frequently diſtinguiſhable by their likeneſs as thoſe children who have been born under none of theſe misfortunes? If the features are not planted during this period, and if imagination be not idle or uſeleſs, how was the ſix-fingered family, mentioned by Maupertuis, continued? When a female of that family married a man who had only the uſual number of fingers, the deformity of her family became uncertain, or ceaſed; and we muſt ſuppoſe her imagination could not have been inactive or diminiſhed, whether alarmed by the fear of continuing a deformed race, or inſtigated by the vanity of tranſmitting a remarkable peculiarity. Were imagination, in a pregnant woman, ſo powerful as many have endeavoured to repreſent it, the mother, profligate at heart, though not actually wicked, would always betray the apoſtaſy of her affections; and even a virtuous woman might divulge that ſhe had looked with as much eagerneſs at a handſome ſtranger as ſhe had looked at the aquiline noſe or other prominent feature of her huſband.

But,

But, admitting that the ſeminal fluid of every male poſſeſſes ſome kind of influence peculiar to that male, and connected with his form, as well as his conſtitution; in the ſame or in ſome ſimilar manner it contains, notwithſtanding the elaborateneſs of its preparation, the ſtamina of diſeaſes, ſome of which often lie longer dormant than even the features of individuals; that the ova are as peculiarly conſtructed, by the conſtitution of the female, as any other parts which depend upon gradual and ſolitary evolution and that theſe, operating upon each other by the intervention of the general ſyſtem of the female, may, according to the power or prevalence of either, affect the features and figure of the incipient animal, or rather the inorganized maſs from which the features and figure of the animal are afterwards to be evolved: admitting all theſe things, will national, or even more extenſive, ſimilitude corroborate the opinion?

While men continue in the ſame climate, and even in the ſame diſtrict, an uniform particularity of features and figure prevails among them, little affected by all thoſe changes which improve or degrade the mind; but, when they migrate, or when they are corrupted by the migration of others, this national diſtinction in time is loſt, though in the latter caſe it ſeems to be recoverable, unleſs the cauſe of change be continued.—The beautiful form and features of the ancient Greeks are at this day diſcernible in their deſcendants, though they are debaſed by intercourſe with ſtrangers, and by forms of government ultimately affecting their conſtitutions; the deſcendants of the few who by chance or deſign have been obliged to ſettle among the ugly tribes in the extremities of the North, have, by their intercourſe with theſe tribes, and by neceſſarily accommodating themſelves to the ſame modes of life, beſides other circumſtances, become equally ugly; and the Jew himſelf, though he abhors to mingle with a different nation, and though his mode of life is nearly the ſame in all climates, yet the ſettlement of his anceſtors in any one particular climate for ſome centuries will very ſenſibly impair the characteriſtic features of his people. As equally in point, and leſs liable to queſtion, we may mention the following ſimilar obſervations. A Scotchman, an Engliſhman, a Frenchman, or a Dutchman, may, even without their peculiarities of dreſs, be almoſt always diſtinguiſhed in their very pictures; the ſturdy and generous Briton, notwithſtanding the ſhortneſs of the period, and the uninterrupted intercourſe, is traced with uncertainty in the effeminate and cruel Virginian: and the Negroes in North America, whoſe familes have continued ſince the firſt importation of theſe unhappy creatures, and whoſe modes of living, excluſive of their ſlavery, are not materially changed, are much leſs remarkable for the flat noſe, big lips, ugly legs, and long heels, than their anceſtors were, or than thoſe who are directly imported from the ſame original nation.

From theſe obſervations it ſeems allowable to infer, that, though climate, manners, occupation, or imitation, cannot materially affect the form or features of the exiſting animal, yet theſe circumſtances, becoming the lot of a ſeries of animals, may, by inducing a change in the general maſs both of the male and female, be the remote cauſe of a change in their product.

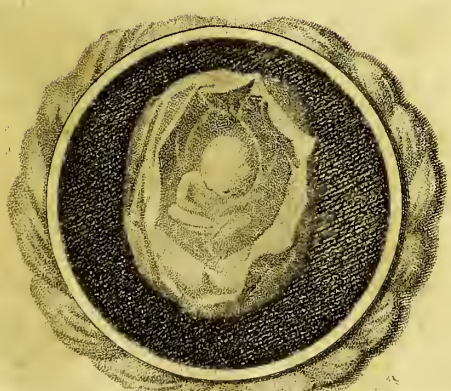
After what has been premiſed, it ſeems rational to conclude, that the prolific fluid, in coition, is neither carried through the Fallopian tubes, nor protruded through the aperture of the uterus, to the ovaria; but that it is taken up by the abſorbent veſſels, and conveyed into the ſanguiferous ſyſtem, where indeed every active principle that can poſſibly affect the human conſtitution is alſo conveyed. That, after circulating through the blood, it is by its natural impulſe, and the additional ſtimulus acquired from the mother, forced through the correſponding veſſels into the ovaria; where, if it finds one or more of the ova in a ſtate fit or ripe for impregnation, conception takes place accordingly: and either one or more are impregnated, as the maturated ſtate of the ovaria might happen to be. But if none of the ova or eggs are in a ſtate ſufficiently mature, or chance to be injured by any offending humours, by debility, or diſeaſe, in either of theſe caſes impregnation is fruſtrated, juſt the ſame as happens to an addled egg, or to a damaged grain of corn thrown into the earth.

On the other hand, if the male organ be deficient in vigour, or the ſemen be defective in quantity, conſiſtency, or active power, it then fails of ſtimulating the female fluid, and is incapable of influencing impregnation. In order therefore that the act of copulation ſhould be productive, the male muſt unqueſtionably convey to the female an elaborate tincture, which poſſeſſes the eſſence of his whole ſyſtem, as well mental as corporeal. In this act, the utmoſt energy and powers of the mind, of the body, and of the ſoul, are intimately connected; and all contribute their particular influence to the ſeed; of which every father muſt be ſenſible, when he recollects the action of the heart, the ſeat of life—of the brain, the ſeat of the ſoul—and of the whole powers of the body, concentrated and impelled, as it were, through the genital ſyſtem.—That this liquor comprehends the active principles of *body and ſoul*, will not I think be doubted in thoſe who give the foregoing arguments their proper weight; and that it conveys with it, more or leſs, the direct image of the parent, I take to be confirmed by the evidence of Scripture; where we are told that one abſolute and unequivocal form was given to man, in the expreſs image of the Deity. So that man, thus organized and commiſſioned, was doubtleſs to convey to future generations that divine image or ſignature which God had graciouſly ſtamped upon him. For this purpoſe the ſeed of man, or efficient principle of

Conception

First Month

Second Month



Third Month

Fourth Month

Dodd del.

J. Pye sculp.

Formation of the Human Fœtus. Plate I.

of generation, muſt be mingled with the vegetative fluid of the female; and, being attracted or taken up by the abſorbent veſſels from the uterine canal, paſſes immediately into the circulating ſyſtem, where, aſſimilating with the peculiar temperature of the mother, and acquiring new energy from the enlivening quality of the blood, it is directed through its natural channels to the ovaria, impregnating the germ by its active quality, and conveying to it the peculiarities it had derived from the conſtitutions, forms, tempers, and diſpoſitions, of the parents, with the ſeeds of whatever diſeaſes, impurities, or taints, were lurking in their blood. For from the blood and brain is the male ſeed primarily elaborated, and into the female maſs is thi thrown and aſſimilated, before impregnation can poſſibly take place. In the courſe of ſix days, I conclude the united tinctures to have travelled through the whole circulating ſyſtem—to have participated of the hereditary forms and peculiarities of the mother, and to have propelled the ovum or egg from its ſeat in the ovaria to a ſuſpended ſituation in the womb, hanging by a minute thread, that afterwards becomes the umbilical veſſel, or aperture through which nouriſhment and life is conveyed from the mother to the child. The firſt viſible ſtate of conception, which reſembles the lucid appearance of a drop of water, tending to coagulation, is correctly ſhown in the firſt figure of the annexed Plate, preciſely in the ſtate it was extracted from the uterus of a female who died on the ſixth day after contact with the male.

At the time the ovum, or rudiments of the embryo, deſcends into the womb, it is indeed very minute; but at the end of about thirty days, we may partly diſcover the firſt lineaments of the fœtus, though ſmall and imperfect, being then only about the ſize of a houſe-fly. Two little veſicles appear in an almoſt tranſparent jelly; the ſmaller of which is intended to become the head of the fœtus, and the larger one is deſtined for the trunk; but neither the limbs nor extremities are yet to be ſeen; the umbilical cord appears only as a minute thread, and the placenta, which only reſembles a cloud above, has no ramifications, or appearances of blood-veſſels. This ſtate of the embryo is expreſſed in the ſecond figure of the annexed Plate.

Towards the end of the ſecond month, the fœtus is upwards of an inch in length, and the features of the face begin to be evolved. The noſe appears like a ſmall prominent line; and we are able to diſcover another line under it, which is deſtined for the ſeparation of the lips. Two black points appear in the place of eyes, and two minute holes mark the formation of the ears. At the ſides of the trunk, both above and below, we ſee four minute protuberances, which are the rudiments of the arms and legs. The veins of the placenta are alſo now partly viſible; as may be ſeen in No. 3 of the Plate.

In

In the third month the human form may be decidedly aſcertained; all the parts of the face can be diſtinguiſhed; the ſhape of the body is clearly marked out; the haunches and the abdomen are elevated, and the hands and feet are plainly to be diſtinguiſhed. The upper extremities are obſerved to increaſe faſter than the lower ones; and the ſeparation of the fingers may be perceived before that of the toes. The veins of the placenta are now diſtended, and are ſeen to communicate with the umbilical tube. This ſtate of geſtation is faithfully delineated in No. 4 of the annexed Engraving.

In the fourth month the fœtus ſeems to be completed in all its parts, and is about four inches in magnitude. The fingers and toes, which at firſt coaleſced, are now ſeparated from each other, and the inteſtines appear, in all their windings and convolutions, like little threads. The veins of the placenta begin to be filled with blood, and the umbilical cord is conſiderably enlarged; as may be ſeen in the fifth figure of the ſubjoined Plate.

In the fifth month, the bodily conformation being perfected in all its parts, and a complete circulation of the blood induced, the mother quickens. The fœtus now aſſumes a more upright figure, which correſponds with the ſhape of the uterus. Its head is found more elevated, its lower extremities are more diſtended, its knees are drawn upwards, with its arms reſting upon them. It now meaſures from ſeven to eight inches in length, and is deſcribed in the firſt figure of the ſecond ſubjoined Plate.

Towards the end of the ſixth month, the fœtus begins to vary its poſition in the womb, and will frequently be found to incline either to the right or to the left ſide of the mother. It will by this time be increaſed to nine or ten inches; and its uſual poſture, after quickening, may be ſeen in the ſecond figure of the ſecond annexed Plate.

In the ſeventh month the child acquires ſtrength and ſolidity; as may be demonſtrated by thoſe painful throws and twitchings which its mother feels from time to time; and it is now increaſed to eleven or twelve inches.

In the eighth month it generally meaſures from fourteen to ſixteen inches; and in the ninth month, or towards the end of its full time, it is increaſed from eighteen to twenty-two inches, or more; when the head, by becoming ſpecifically heavier than the other parts, is gradually impelled downwards, and, falling into the birth, brings on what is termed the pains of parturition, or natural labour. For the exact poſition of the child in the womb during theſe three laſt months, as well as the former, ſee the correſponding figures in the two annexed Engravings, the whole of which were correctly drawn from real fœtuſſes, extracted from the wombs of different women.

Fifth Month

Sixth Month

Seventh Month

Eighth Month

Ninth Month

Formation of the Human Fœtus. Plate II.

Dodd del. Pofs sculp.

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The nourifhment of the fœtus during all this time is derived from the placenta, which is originally formed out of that part of the ovum which is next the fundus uteri. The remaining part of the ovum is covered by a membrane called *fpongy chorion;* within which is another called *true chorion*, which includes a third, termed *amnios*. This contains a liquor, or watery fluid, in which the fœtus floats till the time of its birth. Before the child acquires a diftinct and regular form, it is called *embryo;* but from the time all its parts become vifible, it takes and retains the name of *fœtus* till its birth. During the progrefs of impregnation, the uterus fuffers confiderable changes; but, though it enlarges as the ovum increafes, yet, in regard to its contents, it is never full; for, in early geftation, thefe are confined to the fundus only: and, though the capacity of the womb increafes, yet it is not mechanically ftretched, for the thickneſs of its fides do not diminifh; there is a proportional increafe of the quantity of fluids, and therefore pretty much the fame thickneſs remains as before impregnation. The gravid uterus, or pregnant womb, is of different fizes in different women; and muft vary according to the bulk of the fœtus and involucra. The fituation will alfo vary according to the increafe of its contents, and the pofition of the body. For the firft two or three months the cavity of the fundus is triangular, as before impregnation; but, as the uterus ftretches, it gradually acquires a more rounded form. In general the uterus never rifes directly upwards, but inclines a little obliquely, moft commonly to the right fide; its pofition is never, however, fo oblique as to prove the fole cauſe either of preventing or retarding delivery; its increafe of bulk does not feem to arife merely from diftenfion, but to depend on the fame cauſe and increafe as the extenfion of the fkin in a growing child. This is proved from fome late inftances of extra-uterine fœtufes, where the uterus, though there were no contents, was nearly of the fame fize, from the additional quantity of nourifhment tranfmitted, as if the ovum had been contained within its cavity. The internal furface, which is generally pretty fmooth, except where the placenta adheres, is lined with a tender efflorefcence of the uterus, which, after delivery, appears as if torn, and is thrown off with the cleanfings. This is the *membrana decidua* of Dr. Hunter; which he defcribes as a lamella from the inner furface of the uterus; though Signor Scarpa, with more probability, confiders it as being compofed of an infpiffated coagulable lymph.

Though the uterus, from the moment of conception, is gradually diftended, by which confiderable changes are occafioned, it is very difficult to judge of pregnancy from appearances in the early months. For the firft three months the os tincæ feels fmooth and even, and its orifice as fmall as in the virgin ftate. When any difference can be perceived about the fourth or fifth month, from the defcent of the fundus

through the pelvis, the tubercle or projecting part of the os tincæ will ſeem larger, longer, and more expanded; but, after this period, it ſhortens, particularly at its fore-parts and ſides, and its ori fice or labia begin to ſeparate, ſo as to have its conical appearance deſtroyed. The cervix, which in the early months is nearly ſhut, now begins to ſtretch and to be diſtended to the os tincæ; but during the whole term of utero-geſtation, the mouth of the uterus is ſtrongly cemented with a ropy mucus, which lines it and the cervix, and begins to be diſcharged on the approach of labour. In the laſt week, when the cervix uteri is completely diſtended, the uterine orifice begins to form an elliptical tube, inſtead of a fiſſure, or to aſſume the appearance of a ring on a large globe; and often at this time, eſpecially in pendulous bellies, diſappears entirely, ſo as to be out of the reach of the finger in touching. Hence the os uteri is not in the direction of the axis of the womb, as has generally been ſuppoſed.

About the fourth, or between the fourth and fifth, month, the fundus uteri begins to riſe above the pubes, or brim of the pelvis, and its cervix to be diſtended nearly one-third. In the fifth month the belly ſwells like a ball, with the ſkin tenſe, the fundus about half way between the pubes and navel, and the neck one-half diſtended. After the ſixth month the greateſt part of the cervix uteri dilates, ſo as to make almoſt one cavity with the fundus. In the ſeventh month the fundus advances as far as the umbilicus. In the eighth it reaches mid-way between the navel and ſcrobiculus cordis; and in the ninth to the ſcrobiculus itſelf, the neck then being entirely diſtended, which, with the os tincæ, become the weakeſt part of the uterus. Thus at full time the uterus occupies all the umbilical and hypogaſtric regions; its ſhape is almoſt pyriform, that is, more rounded above than below, and having a ſtricture on that part which is ſurrounded by the brim of the pelvis. The appendages of the uterus ſuffer very little change during pregnancy, except the ligamenta lata, which diminiſh in breadth as the uterus enlarges, and at full time are almoſt entirely obliterated.

The various diſeaſes incident to the uterine ſyſtem, and other morbid affections of the abdominal viſcera, in weak and ſickly females, will frequently excite the ſymptoms, and aſſume the appearance, of real pregnancy. Complaints ariſing from a ſimple obſtruction are ſometimes miſtaken for thoſe of breeding; when a tumor about the region of the uterus is alſo formed, and gradually becomes more and more bulky, the ſymptoms it occaſions are ſo ſtrongly marked, and the reſemblance to pregnancy ſo very ſtriking, that the ignorant patient is often deceived, and even the experienced phyſician impoſed on.

Scirrhous, polypous, or ſarcomatous, tumours, in or about the uterus or pelvis; dropſy or ventoſity of the uterus or tubes; ſteatoma or dropſy of the ovaria, and ventral conception; are the common cauſes of ſuch fallacious appearances. In many of theſe caſes the menſes diſappear; nauſea, retchings, and other ſymptoms of breeding, enſue; flatus in the bowels will be miſtaken for the motion of the child; and, in the advanced ſtages of the diſeaſe, the preſſure of the ſwelling on the adjacent parts. Tumefaction and hardneſs of the breaſts ſupervene, and ſometimes a viſcid or ſerous fluid diſtils from the nipple; circumſtances that ſtrongly confirm the woman in her opinion, till time, or the dreadful conſequences that often enſue, at-laſt convince her of her fatal miſtake.

Other kinds of ſpurious gravidity, leſs hazardous in their nature than any of the preceding, are commonly known by the names of *falſe conceptions* and *moles:* the former of theſe is nothing more than the diſſolution of the fœtus in the early months; the placenta is afterwards retained in the womb, and, from the addition of coagula, or in conſequence of diſeaſe, is excluded in an indurate or enlarged ſtate; when it remains longer, and comes off in the form of a fleſhy or ſcirrhous-like maſs, without having any cavity in the centre, it is diſtinguiſhed by the name of *mole.* Mere coagula of blood, retained in the uterus after delivery, or after immoderate floodings at any period of life, and ſqueezed, by the preſſure of the uterus, into a fibrous or compact form, conſtitute another ſpecies of mole, that more frequently occurs than any of the former. Theſe, though they may aſſume the appearances of gravidity, are generally, however, expelled ſpontaneouſly, and are ſeldom followed with dangerous conſequences. But, when two or more of the ova deſcend into the uterus, attach themſelves ſo near one another as to adhere in whole or in part, ſo as to form only one body, with membranes and water in common, this body will form a confuſed irregular maſs, which is called a *monſter;* and thus a monſter may be either defective in its organic parts, or be ſupplied with a ſupernumerary ſet of parts derived from another ovum. This proceeds from a defect or accident in nature, which it is entirely beyond the power of medicine to rectify or prevent.

It would ſeem, however, from a due contemplation of the foregoing facts, from the frame and ſtructure of females, and from the ultimate end and purpoſe of their conformation, that almoſt every malady reſulting from a ſtate of pregnancy, except the laſt-mentioned, may be in a great meaſure prevented or removed. The natural temperature of women differs in a very conſiderable degree from that of men, inaſmuch as their blood and juices are determined to an oppoſite and diſtinct purpoſe; and hence it is that obſtructions of the menſes, their exceſs, or privation of the office intended them, conſtitute thoſe peculiar maladies which we term *Diſeaſes of Women.*

men. The natural temperature of the male, is *hot* and *dry;* that of the female, *cold* and *moiſt.* The action of the procreative tincture of man is SOLAR, i. e. of the heating and quickening faculty; that of the woman is LUNAR, i. e. of a cool and vegetative quality. As the ſun heats, and gives prolific energy to the fruits of the earth, ſo man fecundates and gives life to the prolific tincture of the woman. Thus the male, as the microcoſm, or epitome of the celeſtial ſyſtem, poſſeſſes an inherent ſimilitude with the ſun, which viviſies and quickens; and thus the female, poſſeſſing an inherent ſimilitude with the moon, vegetates and brings forth the fruit of her womb, and not only feels the influence and ſympathy of that luminary in her monthly diſcharges, but in all the travail and viciſſitudes of pregnancy. To the ſame ſource likewiſe we trace the cauſe, and decide the queſtion, Whether the fruit of the womb be male or female? for, if the male ſeed be predominant, heat will abound, and the male fœtus will be generated; but, if the cooling moiſture of the woman overcomes the maſculine heat in the male ſeed, a female is then produced. The old and exploded notion of this cauſe depending on the child's falling to the right or left ſide of the mother, is too abſurd to weigh a moment on the mind of any reaſonable enquirer.

We diſcover likewiſe that the male, being conſtituted of the ſolar temperature, is naturally ſubjected to thoſe infirmities of body and mind which reſult from the elements of fire and air; while thoſe of the female are of lunar tendency, ariſing from the elements of water and earth. Of theſe four elements our groſs or material part is formed, and by their due and proper commixture in the conſtitution, or circulating maſs, are life and health eſtabliſhed; whilſt, on the contrary, by their diſcordant, defective, or predominant, power, diſeaſe and death are produced. Now the male abounding in heat, and the female in moiſture, is the reaſon why many diſorders incident to man are alleviated by contact with the woman, as thoſe of the woman are by contact with the man. In the grand ſcale of Nature, we find the meridian heat and ſcorching rays of the ſun are qualified and corrected by the cooling moiſture and mild influence of the midnight moon; but, when either of theſe are obſtructed in their effect, by the intervention of accidental cauſes, by ſtorms, by tempeſts, or unſeaſonable blaſts, we then endeavour to repreſs by art the evil conſequences that are likely to enſue. Juſt ſo in the human economy, the grand purpoſe and deſign of medicine is to correct and modify the diſcordant elements in the conſtitution, and give that vigour and tone to the vital powers, which conſtitute the genuine principles of health and life.

From what has been ſuggeſted we might ſafely infer, that the conſtitution and temperature of the female require a medicine of an oppoſite action and tendency to that

that adapted to the male, and which ought to be compounded of elements congenial to the intentions of Nature, calculated to purge the uterus, to purify the ſeminal fluid, and give ſtimulus to the catamenia; which, if not put in motion by the functions of nature, becomes dull and ſtagnant, and vitiates the whole circulating maſs; whence thoſe diſorders, peculiarly incident to the moſt amiable, as being the moſt virtuous, of women, are confeſſedly derived; and for the cure and prevention of which, a peculiar and diſtinct remedy has long been wanting.

Theſe, and other conſiderations, influenced by the known power of ſecond cauſes, and their faculty of acting upon the mechaniſm of the human frame, induced me to attempt the chemical preparation of two ſubtile Tinctures, conſtituted of a co-mixture of the pureſt elements of which our blood is compoſed, and adapted to the particular temperature and conſtitutions of the oppoſite ſexes. That intended for the uſe of Man I call the SOLAR TINCTURE, as being congenial to the ſeminal functions and vital principles of his conſtitution. That adapted to Woman I call the LUNAR TINCTURE, as being calculated to act upon the menſtrual and vegetative fluids, and as being compounded of thoſe elements which make up the frame and temperature of her body. The invention of theſe Tinctures hath been the reſult of a long and laborious application to the ſtudy of unveiled Nature—of the properties of fire, air, earth, and water, in the propagation of animal and vegetable life, and in the compoſition of medicine; in which, though theſe elements form the PABULUM of the univerſe, yet the art of collecting, uniting, and aſſimilating them with the vital fluids, ſeems to be unknown among modern chemiſts, and has eſcaped the obſervation of medical ſcience. The fixidity of theſe Tinctures at once eſtabliſhes their power and efficacy beyond all others; for they can never be affected by change of weather or climate, nor by heat or cold; nor will they ſuffer any diminution of their ſtrength or virtue by remaining open, or uncorked; a circumſtance which cannot be affirmed of any other fluid at preſent known, throughout the world.

I ſhall now proceed to ſhow the action of the LUNAR Tincture on Female conſtitutions; and as this medicine is only intended to remedy ſuch complaints as particularly relate to pregnancy, and the menſtrual diſcharge, I ſhall omit to notice any other maladies, until I come to treat of the SOLAR Tincture; which, though eſſentially directed to give tone and vigour to the conſtitution of the male, is nevertheleſs equally efficacious to the female in removing all diſorders of the blood and lymph, that are alike common to valetudinarians of both ſexes. No complaint in the female habit, therefore, comes under our preſent enquiry, till at or near the age of puberty. Until this important period of the ſex arrives, the Rules heretofore laid down in the Medical Part of my new edition of Culpeper's Family Phyſician, for the ma-

nagement and future health of young ladies, deſerve a very cloſe and ſerious attention. The evident diſtinction between the male and female in their ſtructure and deſign, in their bodily ſtrength and vigour, and in the procreative fluids, demands the utmoſt attention from themſelves, and the tendereſt care from the phyſician. Nor can we too often or too earneſtly caution parents and guardians againſt the evils of that abſurd though faſhionable ſtyle of bringing up young ladies, by confining them almoſt entirely to their apartments, keeping them on poor low diet, and uſing artificial means to make them ſpare and delicate, which contributes more to their prejudice than all the incidental diſeaſes to which they are otherwiſe ſubject. Theſe refinements in female education, beſides deſtroying their ruddy complexion, (which is often the deſign of it,) relaxes their ſolids, impoveriſhes their blood, weakens their minds, and diſorders all the functions of their body, whereby they are often rendered incapable of conception, and denied the felicity of becoming mothers. On the contrary, it ought to be the ſtudy, as it certainly is the duty, of all that have girls under their care, to indulge them in every innocent diverſion, and in every active exerciſe, that can give freedom to the limbs, or agility to the body; all of which have a natural tendency to exhilarate their ſpirits, to promote digeſtion, to ſtimulate their blood and juices, and, at the proper age, to bring on a free and eaſy diſcharge of the menſtrual flux.

Though it is univerſally admitted, that this flux is abſolutely neceſſary to nouriſh and ſupport the fœtus, and that without it human generation cannot be carried on; and that it is conſequently and obviouſly peculiar to the female uterine ſyſtem; yet is it curious to obſerve the various abſurd and contradictory opinions ſome phyſicians have laboured to eſtabliſh, merely, one would ſuppoſe, to bewilder the underſtanding, and ſubject delicate females ſtill more to that erroneous or miſguided treatment, in which their health, their life, and every earthly bleſſing, are too frequently involved.

Dr. Bohn, and Dr. Freind, inſiſt that this flux is nothing more than a plenitude of the common maſs of blood, which nature throws off only for relief againſt the too abundant quantity. Dr. Freind ſuppoſes, that this plenitude ariſes from a coacervation in the blood-veſſels of a ſuperfluity of aliment, which, he thinks, remains over and above what is expended by the ordinary ways; and that women have this plethora, and not men, becauſe their bodies are more humid, and their veſſels, eſpecially the extremities of them, more tender, and their manner of living generally more inactive than that of men; and that theſe things, concurring, are the occaſion that women do not perſpire ſufficiently to carry off the ſuperfluous alimentary parts, till they are accumulated in ſuch quantities as to diſtend the veſſels, and force their way through the capillary arteries of the uterus. It is ſuppoſed to happen

pen to women more than to the females of other ſpecies, which have the ſame parts, becauſe of the erect poſture of the former, and the vagina and other canals being perpendicular to the horizon; ſo that the preſſure of the blood is directed towards their orifices: whereas in brutes they are parallel to the horizon, and the preſſure is wholly on the ſides of thoſe veſſels. The diſcharge, he thinks, happens in this part rather than in any other, as being more favoured by the ſtructure of the veſſels; the arteries being very numerous, and the veins ſinuous and winding, and therefore more apt to retard the impetus of the blood; and conſequently, in a plethoric caſe, to occaſion the rupture of the extremities of the veſſels, which may laſt, till, by a ſufficient diſcharge, the veſſels are eaſed of their overload. To this he adds the conſideration of the ſoft pulpous texture of the uterus, and the vaſt number of veins and arteries with which it is filled. Hence a healthy maid, being arrived at her growth, begins to prepare more nutriment than is required for the ſupport of the body; which, as there is not to be any farther accretion, muſt of neceſſity fill the veſſels, and eſpecially thoſe of the uterus and breaſts, they being the leaſt compreſſed. Theſe will be dilated more than the others; whence, the lateral vaſcules evacuating their humour into the cavity of the uterus, it will be filled and extended. Hence a pain, heat, and heavineſs, will be felt about the loins, pubes, &c. and the veſſels of the uterus, at the ſame time, will be ſo dilated as to emit blood in the cavity of the uterus, and its mouth will be lubricated and looſened, and blood iſſue out. As the quantity of blood is diminiſhed, the veſſels will be leſs preſſed, and will contract themſelves cloſer, ſo as again to retain the blood, and let paſs the groſſer part of the ſerum; till at length only the uſual ſerum paſſes. Again, there are more humours prepared, which are more eaſily lodged in veſſels once dilated; and hence the menſes go and return at various periods in various perſons.

This hypotheſis is judiciouſly oppoſed by Dr. Drake, who maintains, that there is no ſuch plenitude, or at leaſt that it is not neceſſary to menſtruation; arguing, that, if the menſes were owing to a plethora ſo accumulated, the ſymptoms would ariſe gradually, and the heavineſs, ſtiffneſs, and inactivity, neceſſary ſymptoms of a plethora, would be felt long before the periods were completed, and women would begin to be heavy and indiſpoſed ſoon after evacuation, and the ſymptoms would increaſe daily; which is contrary to all experience, many women, who have them regularly and eaſily, having no warning, nor any other rule to prevent an indecent ſurpriſe, than the meaſure of the time; in which, ſome that have ſlipped have been put to confuſion and ſhifts no ways conſiſtent with the notice a plethoric body would give. He adds, that even in thoſe who are difficultly purged this way, the ſymptoms, though very vexatious and tedious, do not make ſuch regular approaches

proaches as a gradual accumulation neceſſarily requires. If we conſider what violent ſymptoms come on in an hour, we ſhall be extremely puzzled to find the mighty acceſſion of matter, which ſhould, in an hour or a day's time, make ſuch great alterations. According to the hypotheſis, the laſt hour contributed no more than the firſt; and of conſequence, the alteration ſhould not be greater in the one than in the other, ſetting aſide the bare eruption.

There are others who give into the doctrine of fermentation, and maintain the evacuation in theſe parts to be an effect of an efferveſcence or ebullition of the blood. This opinion has been maintained by Dr. Charleton, and by Bale, De Graaf, and Drake, the two firſt of whom ſuppoſe a ferment peculiar to women, which produces this flux, and affects that part only, or at leaſt principally. Dr. Graaf, leſs particular in his notion, only ſuppoſes an efferveſcence of the blood, raiſed by ſome ferment, without aſſigning how it acts, or what it is. The ſudden turgeſcence of the blood occaſioned them all to think, that it aroſe from ſomething till then extraneous to the blood; and led them to the parts principally affected to ſeek for an imaginary ferment, which no anatomical enquiry could ever ſhow, or find any receptacle for, nor any reaſoning neceſſarily infer. Again, that heat which frequently accompanies this turgeſcence, led them to think the caſe more than a plethora, and that there was ſome extraordinary inteſtine motion at that time.

Dr. Drake contends, that it is not only neceſſary there ſhould be a ferment, but a receptacle alſo for this ferment; concluding, from the ſuddenneſs and violence of the ſymptoms, that a great quantity muſt be conveyed into the blood in a ſhort time, and conſequently that it muſt have been ready gathered in ſome receptacle, where, while it was lodged, its action was reſtrained. He pretends to aſcertain the place both of the one and the other, making the gall-bladder to be the receptacle, and the bile the ferment. The liquor he thinks well adapted to raiſe a fermentation in the blood, when diſcharged into it in quantity; and, as it is contained in a receptacle that does not admit of a continual iſſue, it may be there reſerved, till in a certain period of time the bladder becoming turgid and full, through the compreſſion of the incumbent viſcera, it emits the gall; which, by the way of the lacteals inſinuating itſelf into the blood, may raiſe that efferveſcence which occaſions the aperture of the uterine arteries. To confirm this, he alleges, that perſons of a bilious conſtitution have the menſes either more plentifully, or more frequently, than others; and that diſtempers manifeſtly bilious are attended with ſymptoms reſembling thoſe of women labouring under difficult menſtruation. But, if this argument be admitted, men would have the menſes as well as women. To this however he anſwers, that men do not abound in bile ſo much as women, the pores of the former being more open, and carrying off more of the ſerous part of the blood, which is the vehicle

vehicle of all the other humours, and conſequently a greater part of each is diſcharged through them than in women, wherein the ſuperfluity muſt either continue to circulate with the blood, or be gathered into proper receptacles, which is the caſe in the bile. The ſame reaſon he gives why menſtruation ſhould not be in brutes: the pores of theſe being manifeſtly more open than thoſe of women, as appears from the quantity of hair which they bear, for the vegetation whereof a large cavity, and a wider aperture of the glands, is neceſſary, than where no ſuch thing is produced: yet there is ſome difference between the males and females even among theſe, ſome of the latter having their menſes, ſuch as the orang outang,* &c. though not ſo often, nor in the ſame form and quantity, as women. But without dwelling on theſe abſtract reaſonings, the abſurdity of which will be obvious to every perſon who turns to the foregoing ſyſtem of human impregnation, we need only remark, that there are two critical periods in every woman's life, that completely deſtroy their hypotheſis. Theſe are, that at the age of fourteen or fifteen, the menſes begin to flow; but ſubſide at the age of forty or fifty. At their commencement, we generally find the difficulty, and conſequent diſeaſe, ariſe from their *deficiency;* whereas, according to the foregoing doctrine, they would then *always* flow with the greateſt freedom. At the period when they ſhould ceaſe, they are apt to come in ſuch abundance as to bring on a flooding, which not only endangers, but too frequently deſtroys, life—a fatal conſequence that could not poſſibly happen, were the above arguments true.

Of FEMININE, or LUNAR, DISEASES.

THAT the vegetative or procreative faculties of women are univerſally governed by the lunations of the moon, their own experience, as well as the demonſtrations given in my Illustration of Astrology, indiſputably prove. The firſt ſhow of the catamenia, if it be natural, invariably comes with the new or full moon; or ſometimes, though very ſeldom, at the commencement of her firſt or laſt quarters; and this effort of nature is juſtly conſidered as the ſure ſign of a procreating ability, and of complete puberty. Whenever this ſeaſon arrives, whether early or late, the conſtitution of every female undergoes a conſiderable change, and the greateſt care and attention are then neceſſary, ſince the future health and happineſs of every woman depends, in a great meaſure, upon her conduct at this period. It is the duty of mothers, and of thoſe who are intruſted with the education of girls, to inſtruct them early in the conduct and management of themſelves at this critical moment. Falſe modeſty, inattention, and ignorance of what is beneficial

* See this curious ſubject, concerning the orang outang, and other animals reſembling the human ſpecies, treated at large, both hiſtorically and philoſophically, in my new Syſtem of Natural Hiſtory, vol. ii. 8vo.

or hurtful at this time, are the ſources of many diſeaſes and misfortunes, which a very little attention might now prevent. Nor is care leſs neceſſary in the ſubſequent returns of this diſcharge. Taking improper food, violent agitatious of the mind, or catching cold, is often ſufficient to ruin the health, or to render the female for ever after incapable of procreation.

In order to eſcape the chloroſis, and other ſimilar diſeaſes incident to young women at that period when the menſes commence, let them avoid indolence and inactivity, and accuſtom themſelves to exerciſe in the open air as much as poſſible. The diſcharge in the beginning is ſeldom ſo inſtantaneous as to ſurpriſe them unawares. The eruption is generally preceded by ſymptoms that indicate its approach; ſuch as a ſenſe of heat, weight, and dull pain, in the loins; diſtention and hardneſs of the breaſts, head-ach, loſs of appetite, laſſitude, paleneſs of the countenance, and ſometimes a ſlight degree of fever. When theſe ſymptoms occur, every thing ſhould be carefully avoided which may obſtruct the diſcharge, and all gentle means uſed to promote it; as ſitting frequently over the ſteam of warm water, drinking warm diluting liquors, &c. When the menſes have begun to flow, great care ſhould be taken to avoid every thing that tends to obſtruct them; ſuch as fiſh, and all kinds of food that are hard of digeſtion, and cold acid liquors. Damps are likewiſe hurtful at this period; as alſo anger, fear, grief, and other affections of the mind. From whatever cauſe this flux is obſtructed, except in the ſtate of pregnancy, proper means ſhould be inſtantly uſed to reſtore it; and if exerciſe in a dry, open, and rather cool, air, wholeſome diet, generous liquors in a weak and languid ſtate of the body, cheerful company, and amuſement, fail, recourſe muſt be had to medicine. In all ſuch caſes, blood-letting muſt be carefully avoided; but let the patient take from 20 to 30 drops of the Lunar Tincture, in a wine-glaſs of warm water, or penny-royal tea, every morning before breakfaſt, every day at noon, and every night before going to bed, until the intention be anſwered, which will uſually take place in three or four days, without the aſſiſtance of any other medicine whatever. But it ſometimes happens in relaxed conſtitutions, that the menſtrual diſcharge, on its firſt appearance, is vitiated, and over-abundant; the conſequence of which is, that the patient becomes weak, the colour pale, the appetite impaired, and the digeſtion languid, ſo that dropſy or conſumption is likely to enſue. Effectually to prevent theſe, let the patient be kept two or three days in bed, with her head low, and obſerve a ſlender diet, principally of white meats, and her drink red-port negus. Every night and morning, for ten or twelve days, let her take one table-ſpoonful of the Solar Tincture, diluted in double the quantity of decoction of nettle-roots, or of the greater comfrey; and after the flux has abated,

abated, and her health and ſtrength ſeem to return, let her only take a table-ſpoonful of the Solar Tincture every other day at noon, in a glaſs of cold ſpring-water; which wonderfully contributes to reſtore a due conſiſtency to the circulating maſs, promotes digeſtion, and invigorates the ſpirits. Before the cuſtomary period returns, ſhe muſt diſcontinue the Solar Tincture; and, if there be the leaſt appearance of irregularity or obſtruction, let her again take night and morning, for two or three days, from 20 to 30 drops of the LUNAR TINCTURE, in a glaſs of penny-royal tea, and ſhe will quickly find a regular habit, and her health amazingly eſtabliſhed. In obſtinate or neglected caſes, where the menſes have ſeceded, and, after an irregular appearance, have turned wholly into the habit, both theſe Tinctures ſhould be uſed with a leſs ſparing hand, particularly under circumſtances in any reſpect ſimilar to the following remarkable

CASE.

Being called to the aſſiſtance of a young lady of fifteen years of age, I was informed her menſes had made an irregular appearance about five or ſix times, coming firſt with the full and then with the new moon, and afterwards at the diſtance of two or three months apart, until they totally diſappeared, and turned back upon the habit. No notice was taken, until the patient was ſeized with a violent bleeding at the noſe, attended with fever, and epileptic fits. After being under the care of an eminent phyſician for ſeveral months, who directed veneſection, and almoſt every cuſtomary application, to no kind of purpoſe, the diſorder fixed in her neck, forming a large tumour, the acrimony of which fell upon her lungs, and threw her into ſtrong convulſions. In this extremity I was ſent for. Perceiving the whole ſyſtem deranged by ſpaſmodic affections, and a locked jaw almoſt finally completed, my firſt object was to relieve the vital organs, by giving force and elaſticity to the circulating maſs. With this view, I with difficulty forced open the mouth, and adminiſtered one table-ſpoonful of the Solar Tincture *undiluted;* and within half an hour, to the aſtoniſhment of her friends, I had the pleaſure of ſeeing every convulſive ſymptom die away, and of hearing the patient's voice, of which ſhe had been totally deprived for upwards of a week before. Two hours after, another ſpoonful of the Solar Tincture was taken with additional ſucceſs; and the patient afterwards continued this medicine in the quantity of a table-ſpoonful, in a wine-glaſs of warm water, three times a-day, for ſix days, at the expiration of which time her appetite and ſtrength were ſurpriſingly returned; and ſhe was then put under a regular courſe of the Lunar Tincture. Twenty drops in a wine-glaſs of penny-royal tea were taken every night and morning for thirteen ſucceſſive days, and on the morning following, it being the full moon, with which her menſes originally came,

ſhe

ſhe had the conſolation to find that every obſtruction was removed, and that the due courſe of nature was completely re-eſtabliſhed. The glandular ſwellings gradually ſubſided, her natural complexion quickly returned, and ſhe now continues in blooming health, perfectly regular, free from all obſtructions, and from every conſequent complaint, thankful for the bleſſings of her recovery, and deſirous of communicating the means to any unfortunate female under ſimilar affliction; and to whom reference may at any time be had, by application to the author.

CHLOROSIS, or GREEN-SICKNESS; by ſome called the LOVE-FEVER.

THIS diſeaſe uſually attacks virgins a little after the time of puberty, and firſt ſhows itſelf by ſymptoms of *dyſpepſia*, or bad digeſtion. But a diſtinguiſhing ſymptom is, that the appetite is entirely vitiated, and the patient will eat lime, chalk, aſhes, ſalt, &c. very greedily; while at the ſame time there is not only a total inappetence to proper food, but it will even excite nauſea and vomiting. In the beginning of the diſeaſe, the urine is pale, and afterwards turbid; the face becomes pale, and then aſſumes a greeniſh colour; ſometimes it becomes livid or yellow; the eyes are ſunk, and have a livid circle round them; the lips loſe their fine red colour; the pulſe is quick, weak, and low, though the heat is little ſhort of a fever, but the veins are ſcarcely filled; the feet are frequently cold, ſwell at night, and the whole body ſeems covered with a ſoft ſwelling; the breathing is difficult: nor is the mind free from agitation as well as the body; it becomes irritated by the ſlighteſt cauſes; and ſometimes the patient loves ſolitude, and becomes ſad and melancholy. There is a retention of the menſes throughout the whole courſe of the diſorder; which eventually fixes on the vital organs, and death enſues.

The above complaint indiſputably ariſes from ſtifling or ſuppreſſing the calls of nature at this vernal ſeaſon, or juvenile ſpring of life, when the primary command of God, "*increaſe and multiply*," is moſt ſenſibly impreſſed upon the whole human fabric. Every tube and veſſel appertaining to the genital ſyſtem, being now filled with ſpermatic or procreative liquor, excites in the female a powerful, yet perhaps involuntary, irritation of the parts, which ſtrongly ſolicits the means of diſcharging their load, that can only be done by venereal embraces. Theſe, from prudential reaſons, being often neceſſarily denied, the prolific tinctures ſeize upon the ſtomach and viſcera, pen back and vitiate the catamenia, choke and clog the perſpirative veſſels, whereby the venal, arterial, and nervous, fluids, become ſtagnant; and a leucophlegmatia, or white flabby dropſical tumour, pervades the whole body, and quickly devotes the unhappy patient to the arms of death. Thus, I am ſorry to remark, are thouſands of the moſt delicate and lovely women plunged into eternity, in the very

very bloſſom of life, when female excellence is but budding forth, big with the promiſed fruit of deliciouſneſs and joy! How much then does it become the duty of parents and guardians, who have daughters or wards in ſituations like theſe, and where no very groſs objection can ariſe, to ſuffer them to marry with the men they love, or otherwiſe to provide ſuitable matches for them; ſince this will effect the moſt rational and moſt natural cure, by removing the cauſe of the complaint altogether. If, however, matrimony be not then convenient, nor likely in a ſhort time to take place, recourſe muſt forthwith be had to proper regimen, and medical aid, otherwiſe delirium or conſumption will quickly enſue. The beſt method of regimen is laid down in the medical part of my edition of Culpeper, page 217. which, if well obſerved, in addition to the following courſe, will generally perform a cure. Take leaves of mugwort, briony, and penny-royal, of each a handful; infuſe them four days in two quarts of ſoft water, and then pour off the clear liquor for uſe. Take a gill-glaſs three parts full, with thirty drops of the Lunar Tincture added to it, three times a-day, viz. morning, noon, and night, till the decoction be all uſed. Then reduce the doſe to twenty drops of the Tincture in a wine-glaſs of cold ſpring-water morning and evening, for fifteen days; after which it may be taken only once a-day, or every other day, until the patient find herſelf free from every ſymptom of the diſeaſe. For this malady, it is the only ſpecific hitherto known; it unclogs the ſpermatic tubes; purges and cools the uterus and vagina; promotes the menſtrual diſcharge, cleanſes the urinary paſſages, diſſolves viſcid humours in the blood, ſharpens the appetite, ſtimulates the nerves, and invigorates the ſpirits, which in all ſtages of *chloroſis* are ſo apt to be depreſſed. When this diſorder is not very obſtinate, nor far advanced, let the patient take from twenty to thirty drops of the Lunar Tincture, in a wine-glaſs of cold ſpring-water, for thirty or forty days ſucceſſively, and it will perform a cure without the trouble of preparing the decoction. In this malady, I have lately had the happineſs of completing an elegant cure, which I mention here, merely for the information of ſuch unfortunate maids as may be languiſhing under the ſame deplorable circumſtances. The following is a literal ſtatement of the

CASE.

A young lady, turned of ſeventeen, had been afflicted with *chloroſis* almoſt three years. In the early part of the malady, ſhe conceived an unconquerable appetite for wood-cinders, concreted mortar, tobacco-pipes, ſealing-wax, &c. The courſes appeared at different intervals of the diſeaſe, but always irregularly, and more or leſs in a vitiated ſtate. About half a year preceding my attendance, this flux had totally ceaſed; but, upon the approach of every new moon, with which her menſes

originally came, ſhe was afflicted with pains in the back and loins, heavineſs and turgidity about the region of the womb, and other cuſtomary ſymptoms of the catamenia; yet not the ſmalleſt ſhow could be brought to appear. A little before this, the lady's affections had been placed on a young man in the neighbourhood; but whoſe ſituation in life was by no means on a ſcale adapted to the views of her father and family. The moment therefore this attachment was diſcovered, the lady was confined to her apartment, and not ſuffered to take either exerciſe or freſh air, but when it ſuited for ſome truſty attendant to accompany her. This confinement brought on a ſettled melancholy, a green ſallow complexion, dejected ſpirits, univerſal laſſitude, and waſting of the fleſh. The morbid ſtate of her body having thus undermined her conſtitution, without attracting either her own or her father's obſervation, the diſorder fell upon the vital organs, and with ſo rapid a progreſs, that within twenty-four hours ſhe was ſeized with an ardent fever, attended with loſs of appetite, delirium, and a total privation of ſpeech. In this ſhocking ſtate, ſhe had the alternate advice of three phyſicians of the firſt reſpectability; but the diſorder increaſing, and putting on the moſt dangerous ſymptoms, after having baffled their utmoſt ſkill, a conſultation was had, and the miſerable patient was conſigned to the grave.

Under theſe deplorable circumſtances, it was my lot to be called in; and, upon a cloſe examination of the patient, ſcarcely any viſible ſigns of life remained. The pulſe had nearly ſubſided. The action of the heart and lungs could ſcarcely be diſcerned. The eyes were ſunk and fixed; yet retained an uncommon look of expreſſion and ſentiment. At this time ſhe had a large bliſter round her neck, another on the pit of her ſtomach; a third, very large, between her ſhoulders; a fourth on the head; a fifth and ſixth inſide the ankles and legs. Veneſection had been ſo often repeated, that ſcarcely blood enough remained to ſupport the heat and action of the heart. In this exhauſted ſtate, I only adminiſtered three table-ſpoonfuls of the Solar Tincture, *undiluted*, at intervals of little more than an hour apart; and in the ſpace of four hours after, I had the heart-felt ſatisfaction of ſeeing the energy of the blood reſtored; pulſation gradually reſumed its action, the lungs were dilated; reſpiration became free; and a profuſe ſweat, which the Tincture induced, fortunately opened the perſpiratory veſſels; and the patient began to give evident ſigns of eaſe and ſenſibility. Warm nouriſhing food was afterwards taken in ſmall quantities; and I was enabled to remove the bliſters, and perform the dreſſings, without pain or torture to the languid patient. The Solar Tincture was now adminiſtered every day for ten days, in the quantity of a table-ſpoonful in a wine-glaſs of warm barley-water, three times in the day, and once in the night, whenever watchfulneſs came on. About the middle of the ſeventh day, ſhe began to articulate, though

though not a word had been uttered for upwards of ſix weeks before; and on the tenth day, her voice and bodily functions were ſo far reſtored, that I deemed it ſafe to give her an interval of ſix days reſt, without any medicine whatever. I had the happineſs to find my expectations completely anſwered; for nature, aſſiſted by nouriſhing food, effected more than a profuſion of drugs; ſo that in little more than twenty days my patient was able to walk about her room, and to put herſelf under a courſe of the Lunar Tincture. This ſhe perſiſted in, with nouriſhing diet, ſeconded by occaſional but very gentle airings in the carriage, for near a month longer; when on the approach of the enſuing new moon, to the unſpeakable joy of her friends, the menſtrual flux reſumed its natural courſe: the comfort and relief of which were ſo viſible to the patient, that ſhe in ecſtacy exclaimed, "*My ſufferings are at an end.*" This lady has ever ſince continued to improve in health and ſpirits in ſo ſurpriſing a degree, that looking back on her late miſerable and reduced ſtate of body, forms a contraſt ſo great as almoſt to exceed belief. Yet the lady and her worthy parent are at all times ready to authenticate the fact to any reputable enquirer, or to the friends of any unfortunate female labouring under a ſimilar affliction.

Of the FLUOR ALBUS, or WHITES.

THE fluor albus, female weakneſs, or whites, as it is commonly called, is a diſeaſe of the womb and its contiguous parts; from which a pale-coloured greeniſh or yellow fluid is diſcharged, attended with loſs of ſtrength, pain in the loins, bad digeſtion, and a wan ſickly aſpect. The quantity, colour, and conſiſtence, of the diſcharge, chiefly depend upon the time of its duration, the patient's habit of body, and the nature of the cauſe by which it was produced. Weakly women of lax ſolids, who have had many children, and have long laboured under ill health, are of all the moſt ſubject to this diſagreeable diſeaſe; from which they unfortunately ſuffer more ſevere penance than others, as the niceſt ſenſations are often connected with ſuch a delicacy of bodily frame as ſubjects them to it. In Holland it is very frequent, and in a manner peculiar to the place, from the dampneſs of its ſituation; the ſurrounding air being ſo overcharged with moiſture, as to relax the body, ſtop perſpiration, and throw it upon the bowels or womb; producing in the firſt a diarrhœa or flux, in the laſt the fluor albus or female weakneſs. The diſcharge often proceeds from the veſſels ſubſervient to menſtruation; becauſe in delicate habits, where thoſe veſſels are weak, and conſequently remain too long uncontracted, the fluor albus ſometimes immediately follows the menſes, and goes off by degrees as they gradually cloſe. It alſo comes from the mucous glands of the womb, as is particularly evident in very young females of eight or ten years old; in whom, though very rarely, it has

has been obſerved, and where it muſt then neceſſarily have eſcaped from thoſe parts, as the uterine veſſels are not ſufficiently enlarged for its paſſage at ſo early a period. Sometimes, as in women with child, it proceeds from the paſſage to the womb, and not from the womb itſelf; which, during pregnancy, is cloſely ſealed up, ſo that nothing can paſs from thence till the time of labour. The application of thoſe inſtruments called peſſaries, from the pain and irritation they occaſion, are alſo apt to bring on this diſcharge. The fluor albus has been ſuppoſed to ſupply the want of the menſes; becauſe, where the firſt prevails, the laſt are generally either irregular, or totally wanting: but it might more properly be ſaid, that the preſence of the fluor albus, which is a preternatural evacuation, occaſions the abſence of that which is natural; as is evident from the return of the menſes after the fluor albus has been cured. Indeed, when this diſcharge appears about the age of thirteen or fourteen, and returns once a-month, with ſymptoms like thoſe of the menſes, then it may be deemed ſtrictly natural, and ought not to be ſtopped. The fluor albus may be diſtinguiſhed into two kinds. The firſt ariſes from a ſimple weakneſs, or the relaxation of the ſolids; which may either be general, where the whole bodily ſyſtem is enervated and unſtrung; or partial, where the womb only is affected, in conſequence of hard labour, frequent miſcarriages, a ſuppreſſion or immoderate quantity of the menſes, or a ſprain of the back or loins. In the firſt caſe, the diſcharge, being generally mild, may be eaſily taken away. In the ſecond, it may proceed from a vitiated or impure blood, where the body from thence is loaded with groſs humours, which nature, for her own ſecurity and relief, thus endeavours to carry off. In ſuch caſes, the diſcharge is often of a reddiſh colour, like that from old ulcerous ſores; being ſometimes ſo ſharp, as to excoriate the contiguous parts, and occaſion a ſmarting, and heat of urine. A deep-ſeated darting pain, with a forcing down, attending ſuch a diſcharge, is a very dangerous and alarming ſign, and indicates an ulceration or cancerous ſtate of the womb. This malignant ſtate of the diſeaſe, if of long continuance, is extremely difficult of cure; and diſpoſes the patient to barrenneſs, a bearing down, dropſy, or conſumption. In ſhort, as this is a malady of the moſt diſagreeable kind, which by long continuance or neglect becomes difficult of cure, and often proves fatal, it were to be wiſhed that women, on ſuch occaſions, would be more attentive to their own ſafety, by uſing all poſſible means, in due time, to prevent the diſorder.

As women are ſometimes connected with thoſe who do not conſcientiouſly regard their ſafety, it is a circumſtance of the utmoſt conſequence to diſtinguiſh a freſh venereal infection from the fluor albus, or whites: for, if the firſt be miſtaken for the laſt,

laſt, and be either neglected or improperly treated, the worſt conſequences may ariſe. In addition therefore to what I have ſtated in page 219 of the Medical Part of my edition of Culpeper, the following ſigns will ſerve to inform the patient whether there be occaſion for her doubts or not. A freſh infection, called gonorrhœa, is malignant and inflammatory; the fluor albus moſt commonly ariſes from relaxation and bodily weakneſs; and therefore the remedies proper in the firſt diſorder, would render the laſt more violent, by locking up and confining the infectious matter. In the gonorrhœa, the diſcharge chiefly proceeds from the parts contiguous to the uninary paſſage, and continues whilſt the menſes flow; but in the fluor albus it is ſupplied from the cavity of the womb and its paſſage, and then the menſes are ſeldom regular. In the gonorrhœa, an itching, inflammation, and heat of urine, are the forerunners of the diſcharge; the orifice of the urinary paſſage is prominent, and the patient is affected with a frequent irritation to make water. In the fluor albus, pains in the loins, and loſs of ſtrength, attend the diſcharge; and, if any inflammation or heat of urine follow, they happen in a leſs degree, and only after a long continuance of the diſcharge, which, becoming ſharp and acrimonious, excoriates the ſurrounding parts. In the gonorrhœa, the diſcharge ſuddenly appears without any evident cauſe; but in the fluor albus it comes on more ſlowly, and is often produced by irregularities of the menſes, frequent abortion, ſprains, or long-continued illneſs. In the gonorrhœa, the diſcharge is greeniſh or yellow, leſs in quantity, and not attended with the ſame ſymptoms of weakneſs. In the fluor albus, it is alſo often of the ſame colour, eſpecially in bad habits of body, and after long continuance; but is uſually more offenſive, and redundant in quantity. The whites often afflict maids of a weakly conſtitution, as well as married women and widows; and indeed there are few of the ſex, eſpecially ſuch as are ſickly, who have not known it more or leſs. For whatever diſeaſe renders the blood poor, foul, or viſcous, and reduces a woman to a languid condition, is commonly ſucceeded by the whites, which, when they come in this manner, continue to weaken the body more and more, and are in great danger, without ſpeedy remedy, of wearing away the patient, and making her a miſerable victim to death. Let no woman, therefore, neglect this diſorder, when ſhe finds it on her, but endeavour to obtain an immediate cure. The regimen and general management are pointed out in the Medical Part of the work juſt referred to, p. 220; and, in lieu of all other medicines, make a decoction of tormentil-root, biſtort, comfrey, and red-roſe leaves; take a gill-glaſs three parts full, and add to it thirty or forty drops of the Lunar Tincture, which muſt be perſiſted in morning, noon, and night, for ten days; then take it morning and evening only for ten days more; after which diſcontinue

the decoction, and take the Tincture every morning for a month, twenty drops in a wine-glaſs of cold ſpring-water, the diſeaſe will be found gradually to abate; and, upon any ſymptoms of a return of it, take from fifteen to twenty drops of the Tincture in a wine-glaſs of cold water every morning for a week, and it will go entirely off; as hath been verified in a great number of patients, who are ready to teſtify that they owe their cure, even in the moſt obſtinate caſes, entirely to the Lunar Tincture.

Of BARRENNESS, or INFERTILITY.

BARRENNESS is ſuch a ſtate of a woman's body, as indiſpoſes it, upon the uſe of the natural means, to conceive and propagate her ſpecies. This proceeds from many ſources, which may be reduced to theſe two general heads: Firſt, An indiſpoſition of the parts to receive the male ſemen in the act of copulation, or that vital effluvium ſtreaming from it, which alone can impregnate the ovaria. Secondly, An inaptitude in the blood to retain and nouriſh the vital principle after it is communicated, ſo as to make it grow and expand its parts, till it becomes a proper fœtus. Conception is alſo hindered by a hectic, hydropic, or feveriſh, ſickly habit; by a deficiency or obſtruction of the monthly courſes, which impoveriſhes the fluids; by the whites, which, continuing too long, relax the glands of the womb, and drown, as it were, the prolific particles; and too often by a *vice* which utterly deſtroys the tone and vigour of the parts; as is fully exemplified in the Medical Part of my Culpeper, p. 221.

Preparatory to the cure of infertility, it is proper to uſe evacuations, unleſs any particular ſymptom ſhows them to be dangerous. Bleeding, lenient purgatives, ſuch as the ſolutive electuary, and a gentle vomit of ipecacuanha, eſpecially if the perſon be plethoric or cacochymic, cannot but be of great ſervice; then proceed with the following ſtrengthening electuary: Take roots of ſatyrion and eringo candied, of each one ounce; powders of cinnamon, ſweet fennel ſeeds, and preſerved ginger, of each half an ounce; mace, roots of contrayerva, and Spaniſh angelica, of each one dram; troches of vipers, one ounce; juice of kermes, ſix drams; tincture of cantharides, half a dram; ſyrup of cloves, a ſufficient quantity to make an electuary. Let the quantity of a large nutmeg be taken every morning early, about five o'clock every afternoon, and at night going to bed; and, immediately after taking the electuary, drink a wine-glaſs full of the following infuſion, adding to it from twenty to thirty drops of the Lunar Tincture, viz. Take cinnamon powdered, one ounce; of ſweet fennel-ſeeds bruiſed, and lavender-flowers, of each half an ounce; Spaniſh angelica root, ginger, contrayerva, mace, and cochineal, of

of each one dram and a half; canary wine, two quarts: infuſe according to art for two or three days, and ſtrain off the infuſion for uſe. Continue the electuary for ten days ſucceſſively; then omit a week, and continue it for ten days more; after which continue the infuſion and Tincture only, three times a-day, for ten days more: then take it only twice a-day for a month, or as long as the caſe requires, adding from fifteen to thirty drops of the Tincture to each glaſs, as the age or conſtitution of the patient may require. This courſe will be found moſt excellent for barrenneſs and debility; particularly while thus aſſiſted by the Lunar Tincture; which will greatly warm and rectify the blood and juices, increaſe the animal ſpirits, invigorate and revive the whole human machine, and not only raiſe the appetite to venereal embraces, but remove the uſual impediments to fertility; prepare the womb for performing its office, and the ova for impregnation. The Tincture warms, comforts, and excites, the generative parts to admiration, and ſeldom fails of curing all common occaſions of barrenneſs in a month or ſix weeks, if duly followed; as a proof of which I beg leave to add the pleaſing circumſtances of the following ſingular

CASE.

A YOUNG LADY of rank and fortune, but of a delicate frame, entered into the marriage ſtate about four years ago. Inſtead of deriving from it that bliſsful gratification which gives the honoured name of Mother, ſhe became weak, languid, pale, and melancholy. The whole nervous ſyſtem was relaxed—the natural functions of the body were ſuſpended—œdematous tumours obſtructed the ſanguiferous paſſages, whence incurable barrenneſs and lingering conſumption were the ſad proſpects left in view. In this melancholy ſtate of body and mind, by advice of her phyſician, when all hopes were at an end, ſhe was put under a regular courſe of the LUNAR TINCTURE; which, to the aſtoniſhment of all, gradually deterged the obſtructed veſſels—propelled the animal juices through the ſyſtem—ſtrengthened and braced the nerves—induced a regular habit—reſtored the ſparkling eye and roſy cheek, and gave new vigour to the animal functions—the reſult of which has been, that before the end of the enſuing year, after her health was thus recovered, the lady became the happy mother of a SON and HEIR, to the inexpreſſible joy of an affectionate huſband and a ſympathiſing family!

INDIS-

INDISPOSITIONS ATTENDANT ON PREGNANCY.

THOUGH pregnancy is not a diſeaſe, but rather a natural alteration of the animal œconomy, which every female is formed to undergo, yet it is attended with a variety of complaints which require great attention; but for the cure or alleviation of which, medical aid has proved very deficient. In theſe complaints, however, the Lunar Tincture exerts moſt extraordinary properties, and excels whatever has been heretofore offered under a medical form. It is an univerſal purifier of thoſe heterogeneous particles which produce nauſea, and ariſe from the combining efforts of the maſculine and feminine tinctures; from whence, according to the groſſneſs of the procreative eſſences at the time of conception, proceed vomiting, pains in the head and ſtomach, fainting, &c. occaſioned by the jarring elements ariſing from the diſproportion in the heat and active principle of the conſtituent parts of the male and female ſeed; which is not only attended with great debility and depreſſion to the mother, in her whole nervous ſyſtem, but often with hereditary diſeaſes, and dreadful conſequences to the infant offspring. Indeed ſo great has been the conflict of the male and female procreative tinctures for the maſtery or predominant power, while paſſing through the circulating maſs or habit of the mother, that the moſt curious and aſtoniſhing phenomena have, on many occaſions, been obſerved to reſult from it.—In a ſmall village in Somerſetſhire, in the year 1759, a girl was born with the hair on her head of two remarkably diſtinct colours: the right ſide, from an exact parallel line which divided the ſkull into two equal parts, was almoſt black; but the left ſide, from the ſame line, was of a reddiſh yellow. As ſhe grew up, the dark hair became of a jet black, exactly like that of her father; whilſt the other became of a ſtrong carrotty red, preciſely reſembling that of her mother; and, after the age of puberty, the hair on the privities, and under the arm-pits, as well as on the arms and legs, was diverſified in the ſame manner; that on the right ſide, all the way down from head to foot, being black; whilſt that on the left was entirely red. The young woman lived till the 28th year of her age, and was reſorted to as a great curioſity.

Another well-known yet remarkable inſtance of this conflict of the male and female procreative tinctures at the time of impregnation, was the caſe of a man who a few years ſince kept a public-houſe in Tooley-ſtreet, Southwark. His father was a white man, belonging to one of the Weſt-India packets; and his mother was a negro-girl, whom he had taken a fancy to, and purchaſed on the arrival of one of the Guinea ſlave-ſhips at the iſland of Jamaica. He brought her with him

to

to London, and in the courſe of the enſuing year ſhew as delivered of a ſon, the whole right ſide of which was white like the father, but the whole of the left ſide was black like the mother. As he grew up, this viſible diſtinction became more ſtrongly marked; and, during the time he kept the above public-houſe in Tooley-ſtreet, he was reſorted to by an immenſe concourſe of people, who flocked there to ſpend their mite, in order to be ſatisfied that ſo great a curioſity really exiſted. The whole of his body appeared to be interſected by an exact parallel line, by which the efforts of conception ſeem to have united the male and female tinctures in preciſe equilibrio, without ſuffering them to intermix in coagula, or in impregnating and expelling the ovum from the ovaria, to its ſuſpended ſtate in the uterus. Hence the hair on the right ſide was long and brown, like that of the father; and half the face, neck, body, and privities, with the arm, thigh, leg, and foot, on the right ſide, were white; while the correſponding parts on the left ſide were black, like the mother, with half the hair on the privities and head black and woolly, exactly like that of a true negro.

A ſtill more curious and ſtriking example of this aſtoniſhing effort in the male and female procreative fluids, is verified in the caſe of Mr. John Clark, of Prefcot-ſtreet, Goodman's-fields. His father was a native of Africa, who by dint of good fortune had amaſſed a conſiderable ſum of money, and ſettled in London. He married a remarkably healthy white woman, a native of Devonſhire, who had been ſome time his ſervant. By her he had two ſons and three daughters, who were mulattos, except the eldeſt ſon, who was the firſt born, and the perſon here alluded to. From the head to the navel, all round his body, he was remarkably fair, had a fine ſkin, handſome round features, light-brown hair, and ſanguine complexion, like his mother; but from the navel downwards he was completely black, with ſhort black woolly hair on the privities, exactly like the father. At the age of thirty he married a young lady of good family and fortune, but of a delicate diſpoſition. For near three months he had the addreſs to conceal this deformity of colour from the knowledge of his wife, by wearing fleſh-coloured ſilk drawers and ſtockings, which he pretended were lined with flannel to keep off the rheumatiſm, with which he had been ſorely afflicted, even to a degree that endangered his life, every time he attempted to leave them off. It happened, however, from ſome neglect of concealment before going to ſleep, that the curioſity of his wife was ſtrongly excited; and the opportunity proving favourable in other reſpects, it being quite daylight in the morning, and her huſband faſt aſleep, ſhe eagerly proceeded to ſatisfy her doubts. Gently turning down the bed-clothes, and removing the other impediments in the way of a complete inſpection, ſhe no ſooner diſcovered the real

ſtate of things, than ſhe ſhrieked out vehemently, and fainted away! The huſband, thus ſuddenly awakened, beheld his wife in a fit, and ſaw with ſorrow and regret the conſequences of a diſcovery which reſulted from his own neglect. He immediately aroſe, called up the ſervants, and procured medical aſſiſtance with all convenient ſpeed; but in vain—the ſudden ſurpriſe, added to the mortification and terror of mind, had ſo powerful an effect, that the lady died in convulſions, nearly two months gone with child. I have often lamented that fortune did not throw me in the way at this critical juncture, for two reaſons: in the firſt place, I have the vanity to think I could have ſaved the patient's life; but, had I failed, in the ſecond, I would have perſuaded Mr. Clark, from motives of philoſophical ſpeculation, and for the improvement of medical ſcience, to have ſuffered me to open the womb of this unfortunate lady, in order to extract the fœtus; which, under the circumſtances of this uncommon conformation of the father, might have enabled me to throw a new light on this very curious ſubject of occult enquiry, perhaps ſo as to have accounted, more obviouſly, for the jarring conflicts and ſtruggling efforts of the maſculine and feminine tinctures; to which alone we are to look to for the formation of hermaphrodites, the production of monſters, &c.

Sympathy and antipathy moſt certainly operate very powerfully on females in the early ſtate of pregnancy, and might, as was then ſuggeſted, have had a principal ſhare in carrying off the above unhappy patient, while no means were uſed to counteract their influence on the maſs of blood. Sudden frights, longing and loathing, and all marks on the fœtus, are obviously derived from this cauſe, and can only be corrected by giving energy and ſtimulus to the circulating ſyſtem, whereby the functions both of mind and body are ſtrengthened, and the nervous fluid fortified and protected againſt the ſudden impreſſion of external objects. It ſeems to be admitted by many eminent practitioners, that the diſeaſes incident to a pregnant ſtate in the early months, ariſe from ſympathy; whilſt thoſe peculiar to the more advanced ſtages of geſtation, are produced by the ſtretching and preſſure of the uterus on the contiguous viſcera. Thus heart-burn and diarrhœa, tenſion and pains of the breaſt, naufea and head-ach, deſire of unnatural food, tremors, and dejected ſpirits, fainting and hyſteric fits, premature menſtruation, and conſequent abortion, proceed from the firſt of theſe cauſes; while coſtiveneſs, ſtrangury, cramp, and cholic, appear to reſult from the other. And, though the celebrated Dr. Stahl, Dr. Cullen, and others, have ſo much differed as to the theory of theſe diſeaſes, yet they all agree that gentle opiates, aromatic infuſions, ſtrengthening bitters, and medicines calculated to give energy to the languid ſtate of the circulation, and to purify the groſs and viſcid elements which oppreſs the ſtomach and viſcera, are the only proper remedies

medies to be adminiſtered. Now the Lunar Tincture poſſeſſes the aromatic and aſtringent virtues in an admirable degree; and is elegantly adapted to invigorate and aſſiſt the active faculties of nature, in expelling all viſcid humours from the ſtomach and bowels; and, being compounded of the moſt ſubtle and occult elements, which preſerve the vital principle, it hence produces the moſt ſalutary effects on all women in a ſtate of pregnancy, by ſtimulating the procreative faculty to the formation of the fineſt children; correcting and purifying the procreative fluid from infection or diſeaſe; preventing moles or falſe conceptions, removing all loathings, longings, or vomiting, and effectively preventing abortion, from any cauſe whatever.—For theſe reaſons, when a woman enters into the ſtate of matrimony, ſhe would do well to take twenty drops of the Lunar Tincture every other morning, to promote conception; ſhe ſhould then continue it three times a-week, from conception to the end of the fourth month; then it may be omitted till a fortnight before her time, when ſhe ſhould take twenty drops in a wine-glaſs of cold ſpring-water every morning till her labour, at which time it will wonderfully ſtrengthen her, aſſiſt her throws, facilitate the birth, promote the lochia, and carry off the after-pains. She might take it occaſionally during the month, in any ſymptoms of cold, fever, or hyſterics, diluted in a wine-glaſs of warm barley-water, about the middle of the day.

Women who are ſubject to miſcarriages, ſhould never fail to take this medicine, from the time they have reaſon to believe they are pregnant, until a full month after they have quickened. It may be taken once, twice, or thrice, a-day, or every other day, as the urgency of the caſe may require, from twenty to thirty drops, in a glaſs of forge-water, or in ſoft ſpring-water in which common oak-bark has been ſteeped; and ſhe will effectually get over all cauſes of abortion. Women after ſudden miſcarriages, or bad labours, will find wonderful relief by taking twenty drops of it in a wine-glaſs of warm barley-water, for a week or ten days. Nurſes, alſo, whoſe milk is griping, or defective, ſhould take it once or twice a-day, or as often as occaſion may require. The intention will quickly be experienced, the milk will be purified and augmented, and all the fluid ſecretions promoted in a manner productive of ſound health, both to the mother and child.—In caſes where œdematous ſwellings of the legs and labia are occaſioned by the interruption of the refluent blood from the preſſure of the diſtended uterus on the vena cava—in violent floodings—in nervous ſpaſms—in epileptic fits, and in obſtinate convulſions, where the *vis vitæ* muſt be ſupported by repleniſhing the veſſels with the utmoſt ſpeed—recourſe ſhould be had to the Solar Tincture, which in the moſt dangerous caſes has been found to give immediate relief; and, if duly perſiſted in, according to the bill of directions, will ſcarcely ever fail to effect a cure.

STATE

STATE OF WOMEN AT THE TURN OF LIFE.

THE moſt critical and dangerous time of a woman's life is that wherein the menſes ceaſe to flow, which uſually happens between forty and fifty years of age. The great change that this produces, by ſo copious a drain being returned into the habit, without previous preparation, is the ſole cauſe of its danger. Every woman muſt be more or leſs ſenſible when this period arrives, and ſhould conduct herſelf accordingly; for, when the menſes are about to go off, they appear for the moſt part irregularly, both in time and quantity; once in a fortnight, three, five, or ſix, weeks; ſometimes very ſparingly, and other times in immoderate quantities. For want only of neceſſary care and attention, during the time that the menſes thus give ſymptoms of their departure, many and various are the complaints that enſue; amongſt which are cold chills, ſucceeded by violent fluſhings of the face, and heats of the extremities; reſtleſs nights, troubleſome dreams, and unequal ſpirits; imflammations of the bowels; ſpaſmodic affections; ſtiffneſs in the limbs, ſwelled ankles, ſore legs, with pains and inflammation; the piles, and other ſymptoms of plenitude. But all this might eaſily be prevented, by attending to a due regimen, and taking theſe Tinctures as occaſion may require. Whenever a woman has reaſon to ſuſpect her menſes are about to leave her, let her loſe four, five, or ſix, ounces of blood, as her habit of body will admit; then let her make a decoction, by taking gentian-roots, one pound; ſenna and orange-peel, of each half a pound; pour upon them a gallon of hot water, and, after it has ſtood twenty-four hours, pour off the liquor for uſe. Let her take from twenty to forty drops of the Lunar Tincture in a gill-glaſs of the above decoction, every night and morning for ten days; then let her continue it every morning for ten days more, and afterwards once every two or three days, or oftener if the terms are of an ill colour and ſcent, until they are corrected. This courſe muſt be followed every ſpring and fall, for a month or ſix weeks ſucceſſively, by all women who find their menſes come irregularly, or too ſparing, until they entirely ceaſe; after whichlet the patient put herſelf under a courſe of the Solar Tincture for a month or ſix weeks, taking one ſpoonful in a wine-glaſs of warm water every night and morning for a week; then let it be taken only once a-day, in cold water, for the reſidue of the time; and, if ſhe takes occaſionally two table-ſpoonfuls of the Solar Tincture, diluted in a tumbler of warm water, as a beverage after dinner or ſupper, inſtead of wine or brandy and water, it will be productive of great benefit in eſtabliſhing a healthful ſtate of the blood, and carrying off the viſcid humours generally produced by the menſtrual flux returning into the habit.

Should

Should it at this time happen, which it often does, that the terms flow too abundantly, and produce a flooding, the patient muſt immediately loſe ſix or eight ounces of blood, and be kept as much as poſſible at reſt, with her head low, until the medicine has had time to take effect; let her diet be ſpare, but not too lax; and let her apply to the following courſe: Take conſerve of red roſes, marmalade of quinces, juice of kermes, candied nutmegs, ſyrup of quinces, and ſyrup of coral, of each half an ounce; aromaticum roſalbum, and aſtringent ſaffron of iron, of each two drams; oil of cinnamon, ſix drops: mix into an electuary, (which might be made up by any apothecary, if the receipt be ſent him;) and take the quantity of a large nutmeg every day at noon for ſix, eight, or ten, days, or longer, as the urgency of the caſe may require, drinking immediately after it twenty drops of the Lunar Tincture in a wine-glaſs of warm water: the flooding, by this means, will gradually abate, the feveriſh ſymptoms will go off, the back will be ſtrengthened, the womb-veſſels cleanſed, and the patient wonderfully reſtored. After the tenth day, in moſt caſes, the electuary might be diſcontinued; and the Lunar Tincture ſhould then be taken every morning for a month, from fifteen to twenty drops, according to the conſtitution of the patient; by which time the parts will be braced, comforted, and coiled up; ſo as to fear no danger of a relapſe. About a month after, let her undergo a courſe of the Solar Tincture, for the purpoſe of rectifying and ſtimulating the maſs of blood; this ſhould be taken for a month; a table-ſpoonful night and morning in a wine-glaſs of cold ſpring-water for the firſt ten days; and then once a-day only for the reſidue of the time; the good effects of which will be ſenſibly and quickly felt.

The intention of nature in returning this flux back into the habit, is to nouriſh and preſerve life, not to deſtroy it. Until the age of puberty, girls require this blood for the ſuſtentation and nouriſhment of their bodies; when that is ſufficiently eſtabliſhed, it is applied to the purpoſes of nouriſhing the fœtus, and of ſuckling the infant after it is born. When child-bearing ceaſes, and the eve of life comes on, the flux is returned back, to comfort and preſerve it; therefore, if women were but careful to obſerve a regular courſe before this flux returns upon them, by adopting the methods I have preſcribed, and by taking the medicine ſpring and fall for two or three years previous to the time, they might not only eſcape the perils and dangers attendant on this period, but would lay the foundation of a ſettled ſtate of health, and enjoy a ſound conſtitution of body to extreme old age.

Of MASCULINE, or SOLAR, DISEASES.

SOLAR diſeaſes are all ſuch as proceed from a hot and dry cauſe, and have their origin in the blood and lymph. For, as the beams flowing from the ſun are the fountain of life and heat to the great world, or univerſal ſyſtem of nature, ſo the blood, flowing from the heart, is the fountain of life and heat to the little world, or univerſal ſyſtem of the *microcoſm*, or body of man. And again, as the ſtream of rays from the ſun regulates the ſeaſons, and produces the variety of climates, ſo the ſtream of blood in man's body, as affected by the ſun, regulates and diverſifies the form and figure of the whole race of human beings. As ſeaſons and climates are ſubject to the external elements, which are ſtill governed by the ſuperior influence of the ſun, ſo they are rendered either mild, healthful, and productive, or turbulent, peſtilential, and barren. Juſt ſo the whole circulating maſs is affected by change of climates and ſeaſons, and by all the variations and agitations of the external elements; and hence diſeaſes are induced in the blood, and are either mild, ardent, or acute, in proportion as the ſanguiferous fluid becomes diſtempered and impaired by the action of the ambient, or contiguous atmoſphere. Thus we perceive the ſolar influence on the human frame, and diſcover that the origin of diſeaſe is in the blood; for, no longer than this vital ſtream is kept in due circulation, pure and uncontaminated, can animal life be ſuſtained, or the body preſerved in health and vigour.

From the expreſs words of Scripture, Levit. xvii. 11, 14. Deut. xii. 23. we are warranted to infer, that "*in the BLOOD is the LIFE;*" and there is not a doubt but the living principle of the blood conſtitutes the life of the body. Of this opinion was the celebrated Hervey, as well as many of the ancient philoſophers and phyſicians; and the late Mr. John Hunter declared himſelf to be of the ſame way of thinking. We find the blood unites living parts, in ſome circumſtances, as certainly as the yet-recent juices of the branch of one tree unite it with that of another. Were either of theſe fluids to be conſidered as extraneous or dead matters, they would act as ſtimuli, and no union would take place in the animal or vegetable kingdoms. This argument Mr. Hunter eſtabliſhed by the following experiment. Having taken off the teſticle from a living cock, he introduced it into the belly of a living hen. Many weeks afterwards, upon injecting the liver of the hen, he injected in the teſticle of the cock likewiſe, which had come in contact with the liver, and adhered to it. In the nature of things there is not a more intimate connection between life and a ſolid than between life and a fluid. For, although we are more accuſtomed to connect it with the one than the other, yet the only real difference

difference which can be ſhown between a ſolid and a fluid is, that the particles of the one are leſs moveable among themſelves than thoſe of the other. Beſides, we often ſee the ſame body fluid in one caſe and ſolid in another. The blood will alſo become vaſcular, like other living parts. Mr. Hunter affirms, that, after amputations, the coagula in the extremities of arteries form veſſels, and may be injected by injecting theſe arteries; and he had a preparation by which he could demonſtrate veſſels riſing from the centre of what had been only a coagulum of blood, and opening into a ſtream of circulating blood. If blood be taken from the arm in the moſt intenſe cold which the human body can bear, it raiſes the thermometer to the ſame height as blood taken in the moſt ſultry heat. This is a ſtrong proof of the blood's being alive; for living bodies alone have the power of reſiſting great degrees both of heat and cold, and of maintaining in almoſt every ſituation, while in health, that temperature which we diſtinguiſh by the name of *animal heat*. Blood is likewiſe capable of being acted upon by a ſtimulus; for it coagulates from expoſure, as certainly as the cavities of the abdomen and thorax inflame from the ſame cauſe. The more it is alive, that is, the more the animal is in health, itcoagulates the ſooner on expoſure; and the more it has loſt of its living principle, as in the caſe of violen tinflammations, the leſs is it ſenſible to the ſtimulus produced from its being expoſed, and it coagulates the later. We may likewiſe obſerve, that the blood preſerves life in different parts of the body. When the nerves going to a part are tied or cut, the part becomes paralytic, and loſes all power of motion; but it does not mortify. If the artery be cut, the part dies, and mortification enſues. What keeps it alive in the firſt caſe? nothing but the living principle which alone can keep it alive; and this phenomenon is inexplicable on any other ſuppoſition than that the life is contained in the blood. Another argument is drawn by Mr. Hunter from a caſe of a fractured os humeri. A man was brought into St. George's hoſpital for a ſimple fracture of the os humeri, or arm; and died about a month after the accident. As the bones had not united, Mr. Hunter injected the arm after death. He found that the cavity between the extremities of the bones was filled up with blood which had coagulated. This blood was become vaſcular, or full of veſſels; in ſome places it was very much ſo. He does not maintain that all coagulated blood becomes vaſcular: and indeed the reaſon is obvious; for it is often thrown out and coagulated in parts where its becoming vaſcular could anſwer no end in the ſyſtem; as, for example, in the cavities of aneuriſmal ſacs. If it be ſuppoſed, that, in ſuch caſes as that juſt now mentioned, the veſſels are not formed in the coagulum, but come from the neighbouring arteries, it is equally an argument that the blood is alive; for the ſubſtance into which veſſels ſhoot muſt be ſo.

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The very idea, that ſuch a quantity of dead matter as the whole maſs of blood circulates in a living body, is abſolutely abſurd.

Thoſe who have ventured to oppoſe this doctrine, and the evidence of Scripture with it, conſider the brain and nervous ſyſtem as the fountain of life; and that, ſo far from receiving its life from the blood, the nervous ſyſtem is capable of inſtantaneouſly changing the craſis of the blood, or any other animal fluid; and, though the nervous ſyſtem cannot continue its action for any length of time if the action of the blood-veſſels is ſuſpended, yet the heart and blood-veſſels cannot act for a ſingle moment without the influence of the nervous fluid. For this reaſon, ſay they, it is plain we muſt ſuppoſe the nervous ſyſtem, and not the blood, to contain properly the life of the animal, and conſequently to be the principal vital organ. The ſecretion of the vital fluid from the blood by means of the brain, is, by the ſupporters of this argument, denied. They ſay, that any fluid ſecreted from the blood muſt be aqueous, inelaſtic, and inactive; whereas the nervous fluid is full of vigour, elaſtic, and volatile in the higheſt degree. The great neceſſity for the circulation of the blood through all parts of the body, notwithſtanding the preſence of the nervous fluid in the ſame parts, they ſay is, becauſe ſome degree of tenſion is neceſſary to be given to the fibres, in order to fit them for the influx of the nervous fluid; and this tenſion they receive from the repletion of the blood-veſſels, which are every-where diſperſed along with the nerves.

To follow this opinion through every argument would prove tedious and unneceſſary, as the following ſhort obſervations will decide the matter abſolutely againſt the patrons of the nervous ſyſtem. In the firſt place, then, if we can prove the life of the human body to have been communicated from a fluid to the nervous ſyſtem, the analogical argument will be very ſtrongly in favour of the ſuppoſition that the caſe is ſo ſtill. Now that the caſe once was ſo, is moſt evident; for the human body, as well as the body of every other living creature, in its firſt ſtate, I have ſhown to be a gelatinous maſs, without muſcles, nerves, or blood-veſſels. Nevertheleſs this gelatinous matter, even at that time, contained the nervous fluid. Of this there can be no doubt, becauſe the nerves are formed out of it, and have their power originally from it; and what is remarkable, the brain is obſerved to be that part of the animal which is firſt formed. Of this gelatinous or procreative fluid we can give no further account, than it is the nutritious matter from which the whole body appears to be formed. At the original formation of man and other animals, therefore, the nutritious matter was made the ſubſtratum of the whole body, conſiſting of muſcles, nerves, blood-veſſels, &c. nay more, it was the immediate efficient cauſe of the nervous power itſelf. Again, in the formation of the embryo,

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we ſee a vital principle exiſting as it were at large, and forming to itſelf a kind of regulator to its own motions, or a habitation in which it chooſes to reſide, rather than to act at random in the fluid. This habitation, or regulator, is undoubtedly the nervous ſyſtem; but at the ſame time, it is no leſs evident that a nutritious fluid is the immediate origin of theſe ſame nerves, and of that very nervous fluid. Now we know, that the fluid which in the womb nouriſhes the bodies of all embryo animals, is neceſſarily equivalent to the blood which nouriſhes the bodies of adult ones; and conſequently, as ſoon as the blood became the only nutritious juice of the body, at that ſame time the nervous fluid took up its reſidence there, and from the blood diffuſed itſelf along the nerves, where it was regulated exactly according to the model originally formed in the embryo. Perhaps it may be ſaid, that the vital power, when once it hath taken poſſeſſion of the human or any other body, requires no addition or ſupply, but continues there in the ſame quantity from firſt to laſt. If we ſuppoſe the nervous power to be immaterial, this will indeed be the caſe, and there is an end of reaſoning upon the ſubject; but, if we call this power a volatile and elaſtic fluid, it is plain that there will be more occaſion for recruits to ſuch a power than to any other fluid of the body, as its volatility and elaſticity will promote its eſcape in great quantities through every pore of the body. It may perhaps be objected, that it is abſurd to ſuppoſe the blood capable of putting matter in ſuch a form as to direct its own motions in a particular way: but even of this we have a poſitive proof in the caſe of the electric fluid. For, if any quantity of this matter has a tendency to go from one place to another where it meets with difficulty, through the air for inſtance, it will throw ſmall conducting ſubſtances before it, in order to facilitate its progreſs. Alſo, if a number of ſmall and light conducting ſubſtances are laid between two metallic bodies, ſo as to form a circle, for example; a ſhock of electricity will deſtroy that circle, and place the ſmall conducting ſubſtances nearer to a ſtraight line between the two metals, as if the fluid knew there was a ſhorter paſſage, and reſolved to take that, if it ſhould have occaſion to return. Laſtly, it is univerſally allowed, that the brain is a ſecretory organ, made up of an infinite number of ſmall glands, which have no other excretories than the medullary fibres and nerves. As a conſiderable quantity of blood is carried to the brain, and the minute arteries end in theſe ſmall glands, it follows, that the nervous fluid *muſt come from the blood.* Now, there is no gland whatever, in the human or any other body, but will diſcharge the fluid it is appointed to ſecrete, in very conſiderable quantity, if its excretory is cut. Upon the cutting of a nerve, therefore, the fluid ſecreted by the brain ought to be diſcharged; but no ſuch diſcharge is viſible. A ſmall quantity of glairy matter is indeed diſcharged from the large nerves;

but this can be no other than the nutritious juice neceſſary for their ſupport. This makes it plain, even to demonſtration, that the fluid ſecreted in the brain *is inviſible* in its nature; and, as we know the nervous fluid hath its reſidence in the brain, it is very probable, to uſe no ſtronger expreſſion, that it is the peculiar province of the brain to ſecrete this fluid from the blood, and conſequently that the blood originally contains the vital principle.

This fact being eſtabliſhed, I ſhall now endeavour to deſcribe the action of *quickening*, or mode by which life is communicated to the child in the womb, which uſually takes place in the fifth month of pregnancy. Opportunities, however, of diſſecting the human gravid uterus at or near this critical juncture occurring but ſeldom, it is with great difficulty that a ſubject of this delicate and abſtruſe nature can be treated with perſpicuity, and is the principal cauſe why it has not been attempted by former phyſiologiſts. I have already ſhown, that the rudiments of the embryo puts forth four membranes, viz. the placenta, the navel-ſtring, the chorion, and the amnios, which contains the fluid above-mentioned, in which the fœtus floats. Until the period of quickening arrives, the embryo poſſeſſes only vegetative life, ſimilar to that of a common plant; and its growth is nouriſhed and preſerved by the fluid in which it ſwims, until the nerves, veins, arteries, and vital organs, are entirely formed, and the circulation of its mother's blood is completed through them, which is conducted in the following manner.

The *placenta* is the medium by which the blood from the heart of the mother is communicated to that of the child; but to check its too rapid progreſs, which would overwhelm the tender veſſels of the infant frame, the texture of the placenta is formed ſimilar to that of a ſponge, round like a cake, of conſiderable dimenſions, and capable of great abſorption, being chiefly made up of the ramifications of the umbilical arteries and vein, and partly of the extremities of the uterine veſſels. The arteries of the uterus diſcharge their contents into the ſubſtance of this cake; and the veins of the placenta, receiving the blood either by a direct communication of veſſels, or by abſorption, at length form the umbilical vein, which paſſes on to the ſinus of the vena porta, and from thence to the vena cava, and heart of the infant, by means of the canalis venoſus, a communication that is cloſed up in the adult. But the circulation of the blood through the heart is not conducted in the fœtus as in the adult: in the latter, the blood is carried from the right auricle of the heart through the pulmonary artery, and is returned to the left auricle by the pulmonary vein; but a dilatation of the lungs is eſſential to the paſſage of the blood through the pulmonary veſſels, and this dilatation cannot take place till after the child is born, and has reſpired. This deficiency is therefore ſupplied in the fœtus by an immediate

immediate communication between the right and left auricle, through an oval opening, in the ſeptum which divides the two auricles, called *foramen ovale*. The blood in the fœtus is likewiſe tranſmitted from the pulmonary artery to the aorta, by means of a duct called *canalis arterioſus*, which, like the canalis venoſus and foramen ovale, gradually cloſes after birth. The blood is returned again from the fœtus to the mother through two arteries called umbilical arteries, which ariſe from the iliacs. Theſe two veſſels, taking a winding courſe with the vein, form with that and the membranes by which they are ſurrounded, what is called the umbilical chord. Theſe arteries, after ramifying through the ſubſtance of the placenta, diſcharge their blood into the veins of the uterus, in the ſame manner as the uterine arteries diſcharged their blood into the branches of the umbilical vein. So that, after quickening, the blood of the mother is conſtantly paſſing in at one ſide of the placenta, and out again at the other, for the nouriſhment of the child.

Now what we call the *action of quickening*, is that inſtantaneous, yet undeſcribable, motion of the vital principle, which, the inſtant the fœtus has acquired a ſufficient degree of animal heat, and is completely formed in all its parts, ruſhes like an electric ſhock, or flaſh of lightning, conducted by the ſanguiferous and nervous fluids, from the heart and brain of the mother, to the heart and brain of the child. At this moment the circulation begins; the infant fabric is completely ſet in motion, and the child becomes a living ſoul. As ſoon, therefore, as the circulation commences, the child ſtarts into life; and the inſtant the circulation ceaſes, life ceaſes alſo. This *act of quickening* is therefore derived from the blood; and is ſo ſenſibly felt by the mother, that ſhe often faints, or feels an internal depreſſion of her animal and vital powers, which may be ſaid, in ſome meaſure, to have departed from her. But the act of quickening does not take place in all women at the ſame period, nor always in the ſame woman at the ſame diſtance of time from her conception; nor is it governed by any given number of weeks or days after conception has taken place; but depends entirely on that inſtant of time, when the joint influence of animal heat, and an entire completion of the nerves, veins, arteries, and other parts and organs, of the fœtus, are fitted and ready to receive and ſupport a due circulation of the blood and juices; for this, and this alone, is the ſource of quickening, and the beginning of animal life. Strong and healthy women will therefore quicken ſooner than the weak and delicate, by reaſon that their procreative and ſtimulating powers are more robuſt, and can ſooner contribute that portion of animal heat which is neceſſary to the entire completion of the fœtus in all its parts; and which will happen ſooner or later, according to the health and ſtrength of the pregnant woman, and her ſufficiency of menſtrual blood to ſupport the demand. For this flux will

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now be wholly taken up by the new ſubject, until the hour of birth; after which it either renews its monthly evacuation, as being redundant in the mother: or if ſhe ſuckles the child, it is then determined to the mammæ, and is converted into milk.

Such is this curious and moſt admirable contrivance of nature, for the re-production and propagation of mankind; and ſuch the nature and event of that myſterious action of quickening, which has hitherto been involved in ſo much darkneſs and obſcurity, as to lead the unthinking multitude to ſuppoſe, that giving life to the fœtus was in every inſtance a new and diſtinct interpoſition of the Deity, inſtead of religiouſly imputing it to that primary exertion of his omnipotence, which, in the original formation of Adam, implanted in his nature the power of re-producing his like, and of imparting life and ſoul to his ſpecies, by a fixed and immutable decree, to be continued down from father to ſon, to the final end and conſummation of this ſublunary would. If the ſeed of Adam had not been originally endued with the gift of imparting life and ſpirit to his future generations, how could the ſouls of his deſcendants be ſubjected to original ſin? Were any one child deſcended from the race of Adam to receive the gift of life and ſoul from a ſubſequent exertion of the power of God, it would become a new and diſtinct act of creation; and the offspring could not poſſibly be contaminated by the Fall, nor be ſubjected to the miſeries and misfortunes reſulting from it, as having received its being from an independent cauſe.

I have, to the beſt of my ability, endeavoured to illuſtrate this occult proceſs of Nature, by means of the annexed copper-plate engraving, taken from the viſcera and womb of an afflicted female, who fainted and died at the time of quickening, the fœtus itſelf being now preſerved in ſpirits. The ſtructure of the gravid uterus is, however, extremely difficult to be ſhown, and the more ſo under theſe peculiar circumſtances. In the wombs of women who die after this period, or at the time of labour, or ſoon after delivery, fibres running in various directions are obſervable more or leſs circular, that ſeem to ariſe from three diſtinct origins, namely, from the place where the placenta adheres, and from the aperture and orifice of each of the tubes; with all the veins and veſſels communicating to and from the placenta and the mother, ſurcharged with blood; but it is almoſt impoſſible to demonſtrate regular plans of veſſels and fibres, continued any length, without an interruption which involves us in doubt, and deſtroys that view of the admirable connexion which nature has formed between the vital organs of the mother and child in a ſtate of advanced pregnancy.

From the foregoing obſervations we may ſafely conclude, that the maſs of blood is the univerſal medium by which life is propagated, and health preſerved, to every claſs

The Action of Quickening.

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claſs of beings; and that, in its impure or infected ſtate, it is the ſource from whence the endleſs number of hereditary diſeaſes derive their origin. Whatever fault impairs the parent blood, fails not to taint the tender habit of its young; whence it has become an eſtabliſhed maxim, that, as healthy parents naturally produce healthy children, ſo diſeaſed parents as naturally produce a diſeaſed offſpring. Some of theſe diſeaſes appear in the earlieſt infancy; others occur equally at all ages; whilſt others lurk unſuſpected in the habit to extreme old age, or even to a new generation, ſlowly impairing the vital organs, and gradually undermining the conſtitution, before their ſource, and fatal tendency, can poſſibly be diſcovered. There are ſome diſeaſes indeed, which, though born with us, cannot be ſaid to be derived from the parent, as when a fœtus receives ſome hurt by an injury done to the mother, while others, neither born with us nor having any foundation in the conſtitution, are ſucked in with the nurſe's milk. Let it then be the care of every parent, who from ſome local misfortune is ſo far compelled to depart from the ties of nature as to abandon her tender offspring to the breaſt of another, to be ſatisfied, as far as human foreſight and medical penetration can reach, that the conſtitution and blood of the nurſe are free from ſcrophula and every other hereditary impurity.

Accidental diſeaſes, though not derived from the parents, nevertheleſs in general ſpring from the blood; which, conſtituting or propagating animal life through every part of the body, is neceſſarily expoſed to every external offending cauſe, from which impreſſion particular accidental diſeaſes enſue. The climate, itſelf, under which people live, will often produce theſe affections in the blood; and every particular climate hath more or leſs a tendency to produce a particular diſeaſe, either from its exceſs of heat or cold, or from the mutability of the weather. An immenſe number of diſeaſes are alſo produced in the blood by impure air, or ſuch as is loaded with putrid, marſhy, and other noxious vapours. The ſame thing likewiſe happens from high-ſeaſoned or corrupted aliment, whether meat or drink; though even the beſt and moſt nutritious aliment will hurt, if taken in too great a quantity; not to mention poiſons, which are endowed with ſuch pernicious qualities, that, even when taken in the ſmalleſt quantity, they produce the moſt grievous ferment in the blood, ending perhaps with death itſelf. There are likewiſe other accidents and dangers to which mankind are expoſed, that ingraft innumerable diſeaſes in the maſs of blood; ſuch as the bite of venomous reptiles, or of a mad dog; an injudicious inoculation or mis-treatment of the ſmall-pox, or meaſles; the pſora, or itch; the venereal infection; alſo broken limbs, wounds, and contuſions;

ſions; which, though proceeding from an external cauſe at firſt, fail not to impair the blood, and often terminate in internal diſeaſes and premature death.

Man, however, is not left without defence againſt ſo many and ſuch great dangers. The human body is poſſeſſed of a moſt wonderful power, by which it preſerves itſelf from diſeaſes, keeps off many, and in a very ſhort time cures ſome already begun, while others are by the ſame means more ſlowly brought to a happy concluſion. This power, called the *autrocrateia*, or *vis medicatrix naturæ*, is well known both to phyſicians and philoſophers, by whom it is moſt juſtly celebrated; for this alone is ſufficient for curing many diſeaſes, and is of ſervice in all. Nay, even the beſt medicines operate only by exciting and properly directing this expulſive force, by which the excrementitious humours from the aliments and blood are expelled, through the proper channels of evacuation, through the excretory ducts, chiefly by means of the *inſenſible perſpiration*, by which power the offending humours from the blood and juices are perpetually flying off. But though phyſicians juſtly put confidence in this power, and though it generally cures diſeaſes of a lighter kind, yet it is not to be thought that thoſe of a more grievous tendency are to be left to the unaſſiſted efforts of nature. Phyſicians have therefore a two-fold error to avoid; namely, either deſpiſing the powers of the *vis medicatrix* too much, which, if left alone, would work a radical and perfect cure; or, putting too great confidence in theſe exertions of nature, they are left unſeconded and alone, till the virulence of infection or diſeaſe undermines the conſtitution, and bears down all before it.

The grand and perpetual means by which the foul and offending humours in the blood and juices are continually carried off, is undoubtedly through the perſpirative pores and veſſels, which it is highly compatible with ſound health to keep open, and for which purpoſe medicaments are principally uſed. When this evacuation is copious, and groſs enough to be diſcerned by the eye, as in ſweat, the perſpiration is ſaid to be *ſenſible;* but where it is ſo volatile as to eſcape the notice of the ſenſes, as is the caſe in the ordinary ſtate of the body, it is called *inſenſible perſpiration*.—The veſſels through which the perſpiration is performed lie obliquely open under the ſquamæ or ſcales of the cuticle or ſcarf-ſkin. They are inconceivably ſmall; from a calculation of Leeuwenhoek it appears, that the mouths of 125,000 of them may be covered with a common grain of ſand. The moſt conſiderable of theſe pores are the orifices of the ducts ariſing from the miliary glands. Through theſe veſſels there is continually tranſuding a ſubtle humour, from every point of the body, and throughout the whole expanſe of the cuticle. The matter evacuated this way is found by certain experience to be more than equal to that evacuated

evacuated all the other ways, *i. e.* by ſtool, urine, &c. Sanctorious found in Italy, under the circumſtances of a moderate diet, middle age, and eaſy life, that the matter inſenſibly perſpired was five-eighths of that which was taken in for food: ſo that there only remained three-eighths for nutrition, and for the excrements of the noſe, ears, inteſtines, bladder, &c.

The ſame author ſhows, that as much is evacuated by inſenſible perſpiration in one day as by ſtool in fourteen days; particularly that, in the ſpace of a night's time, about ſixteen ounces are ordinarily diſcharged by urine, four ounces by ſtool, and above forty ounces by inſenſible perſpiration. He alſo obſerves, that, if a man eat and drink eight pounds in a day, five pounds of it are ſpent in inſenſible perſpiration; and adds, as to the times, that within five hours after eating there is perſpired about one pound; from the fifth to the twelfth hour about three pounds; and from the twelfth to the ſixteenth ſcarcely half a pound. M. Dodart, from a number of experiments made thirty-three years ſucceſſively, proves that we perſpire much more in youth than in age. In ſome perſons the perſpiration is ſo copious, that they void very little of the coarſer excrements, though they eat heartily. The benefits of inſenſible perſpiration are ſo great, that without it animal life could not be preſerved. The general cauſe of perſpiration is the circulation and heat of the blood, which enables it to throw off the offending matter. The great ſubtlety, equability, and plenty, of the matter thus perſpired, its increaſe after ſleep, &c. conſtitute the grand ſymptoms of a perfect ſtate of health; and the chief means of preſerving the ſame. On the contrary, the departing from theſe is the firſt ſure ſign of approaching diſeaſe.

Perſpiration is performed, preſerved, and increaſed, by the viſcera, veſſels, and fibres; by motion or exerciſe as far as the firſt appearance of ſweat; by moderate uſe of venery; by ſleep of ſeven or eight hours, the body well covered, yet not loaded with bed-clothes: cheerfulneſs; light, fermented, yet ſolid, food, not fat; pure, not heavy, air, &c. The contraries of all theſe, as alſo the increaſe of the other excretions, diminiſh, prevent, and deprave, it. Hence we ſee the cauſe and effect of this perſpirable matter, its uſe in preſerving the parts ſoft and flexible, and in ſupplying what is loſt; but chiefly in preſerving the nervous papillæ moiſt, freſh, lively, and fit to be affected by objects, and to tranſmit their impreſſions. Hence it is, that upon a ſtoppage of the uſual perſpiration there ariſe ſo many indiſpoſitions, particularly fevers, agues, rheums, &c. Too much perſpiration occaſions weakneſs, and ſwoonings; whilſt too little, or none at all, occaſions the capillary veſſels to dry, wither, and periſh. Hence alſo the larger emunctories come to be obſtructed; hence the circulation is diſturbed, ſharp humours retained; and

hence

hence putridity, crudity, fevers, inflammations, and impoſthumes. Cold prevents perſpiration, by conſtringing the pores of the ſkin, and thickening the liquors circulating in the cutaneous glands; heat, on the contrary, augments it, both by opening the excretory ducts of the glands, and by increaſing the fluidity and velocity of the humours. To determine the ſtate and condition of the perſpiration, ſo neceſſary for judging of thoſe of the body, Sanctorious invented a weighing-chair, whereby he examined the quantity, degree, &c. of perſpiration in ſeveral circumſtances of the body, under ſeveral temperatures of the air, and in the ſeveral intervals of eating, drinking, ſleeping, &c.

Some of the more extraordinary phenomena obſerved in this ſpeculation, are, that, for ſome time after eating, the perſpiration is leaſt of all; that between the fifth and twelfth hour after meals perſpiration is greateſt; that riding either on horſeback, in a coach, or ſhip, &c. ſwift motion on the ice, &c. but, above all, a briſk friction of the ſkin, promote preſpiration ſurpriſingly; and that perſpiration is naturally always much leſs in women than in men. Perſpiration is influenced by the paſſions of the mind. Thus anger and joy increaſe, and fear and ſadneſs leſſen, both perſpiration and urine. Anger cauſes a ſtrong motion in the membranes of the heart, and quickens its contraction and dilatation, and thereby quickens the contraction and dilatation of the blood-veſſels and ſecerning ducts, and of conſequence increaſes the diſcharges of perſpiration and urine; and that more or leſs, in proportion to the ſtrength and continuance of the paſſion. Joy affects theſe diſcharges in like manner as anger. In the paſſions of fear and ſorrow, perſpiration and urine are leſſened, by the depreſſion of the activity of the ſoul under thoſe paſſions. The proportion of perſpiration to urine is increaſed by all thoſe exerciſes which increaſe the motion of the blood, and warm the ſkin.

We have an account of a perſon who, by paſſing many nights in aſtronomical ſpeculations, had his perſpiration ſo obſtructed by the cold and damp of the air in Holland, that a ſhirt he had worn for five or ſix weeks was as clean as if it had been worn but one day. The conſequence of this was, that he gathered ſubcutaneous waters; but was cured in time. The garments beſt calculated to encourage and promote inſenſible perſpiration, to keep the mouths of the minute veſſels open, and to guard the body from the too ſudden and violent effects of cold, are thoſe made of flannel. Whence flannel ſhirts and waiſtcoats, or a ſquare piece of flannel worn over the breaſt or pit of the ſtomach, particularly in the winter months, are productive of ſuch beneficial effects to weakly and debilitated conſtitutions, and act as a valuable perſervative to the hale and robuſt. In the annexed copper-plate engraving, I have endeavoured to ſhow the manner in which the inſenſible perſpiration

iſſues

The Insensible Perspiration

Dodd del. Published as the Act directs June 20 1794 by E. Sibly. Pass. sculp.

iſſues from the pores of the body, which can only be diſcerned by means of a lens; being of ſo volatile and ſubtle a quality, that it paſſes through our garments with the utmoſt eaſe, particularly if woollen; and it even aſcends through the bed-clothes like a miſt, in the greateſt abundance when we are aſleep, and the animal functions are at reſt.

In this manner Nature, from all caſual obſtructions, endeavours to relieve herſelf; and, ſo long as diſeaſes are recent, and of a mild tendency, they are uſually carried off by this means, without requiring any aid from medicine. When, however, diſeaſes are of long ſtanding, and the humours in the blood become too foul and viſcous to be thrown off by the *vis medicatrix naturæ*, the whole habit is quickly vitiated, and the circulating maſs becomes morbid; yet even in this infected ſtate, the vital heat and activity of the blood ſtrives to purify itſelf, by determining theſe morbid particles to the ſkin, where they form ſcabs, ulcers, pimples, and other ſpots, as in the ſcrophula, leproſy, ſmall-pox, meaſles, ſyphilis, &c. or elſe the virulent matter is directed inwards, where falling upon the lungs and other viſcera, death quickly enſues. Here then we may view the ſhocking conſequences which reſult to thoſe who enter into matrimony under a tainted or infected ſtate of the blood. Indeed perſons that are afflicted with the leproſy, ſcrophula, or king's evil, ſhould never marry until a perfect cure has been effected, and a pure and healthful ſtate of the blood induced. To enter into wedlock under a venereal taint, is a moſt unwiſe, a moſt cruel, and an ungenerous act. A man with only a ſlight infection, by contact with the woman, will himſelf perhaps experience a perfect cure, in conſequence of the foul and infectious matter being drawn from the parts of the female organs, ſeconded by the action of the rugæ and abſorbent veſſels on the ſurface of the vagina. But the unhappy female is ſure to take the diſorder; and, ſhould ſhe prove with child, ſhe not only carries the poiſonous infection into the marrow of her own bones, but brings an infant offspring into the world, devoted to miſery and diſeaſe; for whatever foul or infectious humour is implanted in the parent blood, it is immediately carried by the circulation to the vital organs of the child, juſt as the flame of one candle is by contact communicated to another. Nor can we be ſurpriſed at theſe things, if we only reflect on what has already been adduced, and contemplate the ſyſtem and œconomy of the human frame. Conſider only the powerful effects of a few grains of cantharides, which, if externally applied, act as a burning cauſtic; but, if taken into the ſtomach, inſtantly overturn the natural courſe of the circulation, by forcing the whole maſs of blood into the extremities, but more particularly, with great vehemence and turgidity, into the private parts; for which reaſon cantharides are taken with intent to

cure the weakneſs and debility of the penis; but the truth is, that greater debility, and an emaciated conſtitution, are ſure to follow, and not unfrequently inſtant death.

If, then, ſo powerful an effect can be wrought on the blood by ſwallowing a few irritating particles of a ſmall inſect, may we not juſtly infer, that by infuſing into the circulating maſs particles congenial to itſelf, the utmoſt relief may be afforded to it, even in its moſt depraved and inactive ſtate? From this conſideration alone, we may venture to pronounce, that all diſorders originating in the blood might either be prevented or repelled, could ſuch a medium be diſcovered, by which we might infuſe immediately into the maſs a combination of ſuch elemental principles as the blood and juices themſelves conſiſt of in their pureſt and moſt elaſtic ſtate; for this, in fact, is the aim of all medicines; but which they miſs, by being adminiſtered in their groſs form, and being obliged to paſs the ſeveral digeſtive operations of the ſtomach, before they can reach the blood, whereby the principal part of their occult virtue is loſt among the food, or ſecreted in ſuch ſmall quantities as to produce very little effect. But a medium, poſſeſſing theſe congenial principles, ready digeſted, and ſo combined as to be taken inſtantly, and without diminution, into the habit, would not only keep the cruor and the ſerum in due proportion, which is ſo eſſential to health, but would ſtimulate, correct, purify, and augment, the blood, as its reduced or diſordered ſtate might from time to time require. Such a medium, after infinite labour, and unlimited experience, I pronounce the Solar Tincture to be; and ſuch will be found its operative effects, under whatever circumſtances it may be adminiſtered, in any climate or ſeaſon; the innocent and balſamic qualities of which are as grateful to the internal organs of the human frame as the ſolar rays are cheering to the external; and it affords me no ſmall gratification to aſſert, that, in offering it to the public, I invade no man's property, nor imitate any medicine at preſent known in public or private practice.—The experiments I have made with it upon a variety of diſeaſed wretched objects, exceed belief; and I ſhall ſtill continue to adminiſter it gratis to the poor, who are given over by others, or who have not the means of applying for medical aſſiſtance.

The infinite variety of complaints an impure or infected ſtate of the blood induces, almoſt exceeds belief; and hence the new and deceptive forms a ſcrophulous or ſcorbutic taint puts on, which often deceive the moſt eminent of the faculty, and baffle the beſt intention towards a cure. An impure or ſcrophulous taint will invade the nobleſt organs of the human frame, before the patient can be aware of his danger. In the firſt ſtage of its viſible effects, a weary pain ſeizes the joints and muſcles, attended with a waſting of the legs and loins. In the ſecond ſtage, the gums ſwell, grow painful, hot, and irritable, and bleed upon the ſlighteſt preſſure; the

the roots of the teeth become bare and looſe, and the breath nauſeous. In the third ſtage, the gums grow putrid, the teeth black and rotten, the ſublingular veins become varicoſe, and the breath cadaverous; fœtid blood diſtils from the lips, gums, mouth, noſe, lungs, ſtomach, liver, ſpleen, pancreas, inteſtines, womb, kidneys, &c. ſcabs and ulcers break out in all parts of the body; and the joints, bones, and viſcera, become morbid. In the fourth ſtage, putrid, eruptive, and ſpotted, fevers, enſue, which end in an atrophy; or elſe follow diarrhœas, dyſentery, dropſy, conſumption, palſy, contractions, melancholy, and all the long and direful train of nervous diſorders, which to deſcribe would fill a volume.

To counteract this moſt virulent of all chronic complaints, the utmoſt exertions of human ſkill have been employed. The remedies preſcribed in its different ſtages are almoſt innumerable. The object is to reduce the virulence of the infection, and to eradicate its ſeeds from the blood and lymph; to which end the mildeſt and moſt ſimple medicines are recommended. Mineral and tar waters, for their warm and ſtimulating quality; milk or whey, from their ſimilitude to the chyle; the cold bath, for bracing the ſolids and quickening the circulation; antiſcorbutic vegetables, &c. for purging and ſweetening the blood, ſuch as ſcurvy-graſs, water-creſſes, wormwood, hemlock, centaury, vervain, water-trefoil, juniper-berries, the Peruvian bark, ſaſſafras, guaiacum, aloes, aſſa-fœtida, camomile, diaſcordium, ſaffron, ſenna, rhubarb, manna, Æthiop's mineral, hartſhorn, native cinnabar, antimony, &c. When theſe fail, mercury, or a mercurial ſalivation, is looked upon as the only cure; which, in fact, is but to give the human frame its laſt vehement ſhock, and to ſend the wretched patient in agonies to the grave!

The intention of all theſe remedies is to impregnate the blood with qualities oppoſite to thoſe with which it is infected; and this muſt be done in a ſuperior degree of force and power, before a cure can be completed. But theſe medicaments are often adminiſtered under ſuch nauſeous forms, and in ſo crude and unqualified a ſtate, that they not only torture the patient, but miſs entirely their intended aim. The nauſeous taſte of medicine is nothing but its groſſer particles; which, inſtead of entering the ſtomach, to irritate and oppreſs its organs, ought to be drawn off by chemical proceſs; for it is the occult virtue of every drug, not its groſſer part, that performs the cure. Now the peculiar excellence of the Solar Tincture is, that it combines the eſſential and occult virtues of all the ſcorbutic vegetables, ready digeſted, concocted, purified, and reſolved into an elegant balſamic eſſence, pleaſing to the taſte and grateful to the ſtomach. It flies immediately to the heart, whether internally or externally applied, blends and aſſimilates with the venal and arterial blood, which it generates, corrects, warms, purifies,

dry, and ſometimes moiſt, ſcabs and tumours on the ſkin. Being neglected, it at length pervaded the whole ſyſtem, till, turning inwardly, it fell upon his lungs, and reduced him to the laſt ſtage of a conſumption. In this deplorable ſtate, given over by the faculty, left totally emaciated, and incapable of turning in his bed, he fortunately had recourſe to the Solar Tincture. The firſt doſe was given *undiluted*, which threw him into a fine perſpiration, and compoſed him to ſleep, which had long been a ſtranger to his eyes. After one large bottle had been adminiſtered, agreeable to the bill of directions, at the end of a week he was ſo much reſtored, that with very little aſſiſtance he was enabled to put on his own clothes; and, after continuing the medicine for little more than a month, he was able to walk abroad. And now, after having continued the Tincture night and morning, and occaſionally uſing it as a beverage made ſimilar to warm brandy and water, he has quite recovered his former health and ſtrength; being, to the ſurpriſe of every body who beheld him in his late emaciated condition, as robuſt and as hearty as it is well poſſible for a man to be.

DEBILITATED, TAINTED, AND ENFEEBLED, CONSTITUTIONS.

MUSCULAR debility was a misfortune but little known to our forefathers. Whether immured in venereal embraces, or ſacrificing at the ſhrine of Bacchus, moderation and ſeaſonable hours directed the meaſure of their enjoyment. If revelry or voluptuouſneſs by chance unſtrung their nerves, gymnaſtic exerciſes and field-ſports, or the more pleaſurable delights of the chace, quickly reſtored them to their proper tone,—gave new vigour to the blood,—health to the cheek,—and lighted up afreſh the flame of love. But now, how ſtrange is the reverſe. Habituated to effeminacy, and fed with dainties,—revelling all night with wine, and ſtretched on beds of down all day,—ſhut up in ſtews and brothels, ſcarcely breathing wholeſome air,—claſped in the arms of tainted or diſeaſed females, until enjoyment palls upon the ſenſes, and the muſcular powers abſolutely refuſe their office;—no wonder ſo many men are found old in every thing but years; whoſe conſtitutions are fairly worn down, blood ſtagnant, ſolids relaxed, ſecretions diverted from their proper courſe, muſcles debilitated, eyes ſunk, cheek pallid, and ſpirits gone. Theſe are not half the evils reſulting from this faſhionable ſource of deſtructive folly. It may not be amiſs, however, to deſcribe the remarkable caſes of a few, of whom the Solar Tincture has made perfect cures, by infuſing a new portion of health into the maſs of blood; ſincerely hoping, that a more wiſe and manly courſe of life will ſhortly eradicate theſe diſgraceful complaints, and reſtore to the ladies a genuine race of Engliſhmen and Britons.

CASES.

CASES.

PREMATURE DEBILITY.—A gentleman in the army, under thirty years of age, complained to me that he had all at once *become incapable of enjoying his wife.* Suſpecting the nature of his diſorder, I deſired him to be open and candid, to relate to me his *real* ſituation, and not a *pretended* one, which was only to impoſe on his own underſtanding. He thanked me for the rebuke—ſaid he would be frank, and in a few words declared, That from exceſſive luſt, and continual debauch, he had loſt his virility; and, to add to the misfortune, he was on the eve of being married. In other reſpects he felt no diminution in his health or conſtitution; and, from external appearances, this was ſurely the laſt imperfection that could have been ſuſpected. His complexion was vigorous and lively, his fleſh firm, and conformation excellent; yet, notwithſtanding this, he was impotent to ſuch a degree, that neither the ſtrength of his own deſires, nor the excitations of the female, could affect the part. It often happens, that, though the organs remain ſound, yet, if the nervous and ſeminal fluids have degenerated from a healthful ſtate—if they are impoveriſhed by being too much drained, or turned into an unnatural courſe—they cannot then perform their office, by reaſon that their moving powers and ſtimulus on the blood are become too weak to direct their force and action in the manner nature requires in the act of copulation. I therefore enjoined him, to abſtain entirely from all attempts of the kind, for three months at leaſt; directed the ointment as in p. 240 of the Medical Part of this work, with the Solar Tincture three times a-day for two months; then twice a-day, until he found it no longer neceſſary. After taking ſix large bottles, he generouſly thanked me for a more hale and robuſt ſtate of body than he ever remembered to have enjoyed before. He has ſince ſent me ſeveral patients, in almoſt as debilitated a ſtate as himſelf, who are now ready to unite with him in giving full teſtimony to the renovating powers and peculiar efficacy of the Solar Tincture.

A RELAXED HABIT.

LITTLE more than three months ago, a gentleman, about fifty years of age, lately returned from the Eaſt-Indies, applied to me for the cure of what he termed a *broken conſtitution.* He had made very free with the ſable beauties of Bengal—had undergone a mercurial ſalivation, and appeared to be ſinking under an univerſal languor and debility of the whole muſcular ſyſtem. The ſphincter of the bladder was ſo weakened, that the urinary ſecretion came from him by drops, in ſo perpetual and involuntary a manner, as not to be perceived until the moiſture of one ſet of cloths became ſo ſenſibly afflicting as made it neceſſary to ſupply

freſh

freſh ones, which uſually happened every hour. The corporeal functions were diſſipated and relaxed, the tone of the ſtomach and viſcera was nearly gone, the tremulous nerves reluctantly performed their office, and the circulation was become ſtagnant and morbid. I adviſed an immediate recourſe to the moſt nouriſhing food, with ſtrong port-wine negus for his drink, and the Solar Tincture to be taken four times a-day for the firſt month; three times a-day for the ſecond month, and once or twice a-day afterwards, as occaſion might ſeem to render neceſſary. Before the expiration of twenty days, the ſphincter muſcle acquired its proper tone, the pulſe became ſtrong and regular, and the nervous tremors were conſiderably abated. By the end of the ſecond month, a renovation of the whole animal œconomy ſeemed to have taken place, and a viſible accumulation of the blood and juices had retrieved the circulation. Before the expiration of three months, I had the gratification to ſee this patient completely reſtored to ſuch a ſtate of bodily health and ſtrength, as utterly aſtoniſhed himſelf, after taking only eight large bottles of the Solar Tincture.

HYPOCHONDRIACAL DEBILITY, OR WEAK NERVES.

A GENTLEMAN in Oxfordſhire lately came to town on purpoſe to conſult me in his complaint. He appeared to be near thirty years of age, of middling ſtature, but of a weakly conſtitution. He had for upwards of ſeven years paſt paid his addreſſes to a lady, whom he had long promiſed, and very much deſired, to marry; but, whenever he propoſed in his mind to fix the day, or whenever it happened that he attempted to ſalute or embrace her, he was ſeized with an unaccountable tremor of the whole body, his ſpirits ſunk, his virility left him, and a violent palpitation of the heart enſued. In ſhort, he was ſo diſtruſtful of his own powers, that he confeſſed it was the fear of not being able to perform the rites of the marriage-bed that had been the real and the ſole cauſe of thus protracting his wedding-day. This is certainly a moſt ſingular inſtance of the hypochondriacal affection, and of its derangement of the nervous ſyſtem. The debility induced by it, ſeems to ariſe from the weaker energy of the brain, the fault of which, however, cannot be detected by the niceſt anatomiſt. For this reaſon, we do not well know how ſuch defect ſhould be reſtored; but as nature, ſeemingly for this purpoſe, excites the motion of the heart and arteries, we muſt aſcribe the continuance of ſuch debility to the too-weak reaction of the ſanguiferous ſyſtem. The heart will generally palpitate from a violent excitement of the nerves, eſpecially when the blood is endowed with too ſmall a ſhare of ſtimulus. Hence palpitation from any affection of the mind, and from hyſterics in women. Under whatever circumſtances this hypochondriacal affection happens, it debilitates the whole animal machine, and renders the perſon unable to perform the proper offices of life. The proſtration of ſpirits, weakneſs, and languor, are often

often ſurpriſingly great, though the pulſe ſeems tolerably ſtrong, as being heightened by animal deſire. The effect, however, is ſure to produce a languid circulation, the blood ſeeming to adhere, with uncommon energy, about the region of the heart. I ſuſpect it is in theſe caſes that cantharides are moſt frequently uſed. The patient acknowledged, after ſome heſitation, that he had tried them; but they only produced an involuntary though violent erection, by no means adapted to the cure, nor to the purpoſe he intended. Hence this remedy is not only inadequate, but extremely dangerous; for it too much exhauſts the vital powers, and is followed by a vaſt dejection of ſpirits, tremors, ſtartings of the tendons, &c. which bring on rigours, cold clammy ſweats, ſyncope, and often premature death.

The means, therefore, which nature points out for the cure of this ſpecies of debility, are directed to ſupport and increaſe the action of the blood through the heart and arteries; and the remedies to be employed are tonics and ſtimulants. Of all the ſtimulants, which in this conſtitutional defect may be advantageouſly employed, port-wine ſeems to be the moſt eligible. It has the advantage of being grateful to the palate and ſtomach, and of having its ſtimulant parts ſo much diluted, that it can be conveniently given at all times and ſeaſons, and may be employed with ſufficient caution; but it is of little ſervice unleſs taken pretty largely.—It may be ſuſpected that wine has an operation analagous to that of opium; and on good grounds. But we can diſtinctly mark its ſtimulant power only; which renders its effects in the phrenitic delirium manifeſtly hurtful, but in caſes of debility as remarkably uſeful.—Hence I directed the Solar Tincture to be taken morning, noon, and night, in ſtrong doſes, for the firſt month; once a-day, or oftener, at the diſcretion of the patient, until the end of the third month; but to drink every day after dinner, a pint of generous port; and to inform me at intervals the change he might find in his conſtitution. He took with him a dozen large bottles of the Solar Tincture; and before a month elapſed, I had the pleaſure of receiving an epiſtle of unfeigned thanks. He found himſelf ſo much reſtored by the courſe I laid him under, that, before the expiration of the three months, he married the lady; and I have no douht will very ſhortly have iſſue.—I have been ſomewhat more elaborate in deſcribing the particulars of this caſe, having reaſon to believe it is not an uncommon malady; and would therefore wiſh to enable every patient to become as much as poſſible a judge of his own infirmity.

NOCTURNAL EMISSIONS, OR INCONTINENCE OF THE SEMEN.

A YOUNG man, of robuſt make, and in the prime of life, being under twenty-ſix years of age, applied to me for relief in the above unfortunate complaint. It appeared, that, from the time of puberty, he had found a weakneſs in the part, and

an occaſional diſcharge of the ſeed, upon the ſlighteſt irritation. As he grew up to greater maturity, the malady increaſed upon him. Upon every attempt to have contact with a female, ſemen paſſed involuntarily from him, before even a complete erection could take place, whereby his purpoſe was continually defeated. This defect grew upon him, until the bare ſight or thought of any thing which tended to excite venereal deſires brought away the ſeed; yet it had no affinity whatever to a gleet, becauſe the emiſſion never occurred but either in the attempt or in the deſire of copulation, or under the influence of laſcivious dreams. In proportion as this weakneſs grew upon him, his deſire of familiarity with the ſex became the ſtronger; and, I am inclined to think, was the principal reaſon of the increaſe of the malady, and of the nocturnal emiſſions, which happened more or leſs every time he went to ſleep. This inceſſant diſcharge had reduced him to a meagre viſage, ſallow complexion, hollow eyes, depreſſion of ſpirits, and ſlow fever; and a galloping conſumption would ſoon have followed. I directed the Solar Tincture every morning at ſun-riſing, at mid-day, and at ſix o'clock in the afternoon, in the quantity of a wine-glaſs full, with one-third warm water; and every night at going to bed, twenty drops of liquid laudanum, for the purpoſe of making his ſleep too ſtrong to be affected by the influence of dreams. This courſe, aſſiſted by a ſtrengthening regimen of calf's-foot jelly, veal-broth, and ſtrong port-wine negus, had very quickly the deſired effect. His ſleep was perfectly ſound and calm, and, after the firſt night, he could not recollect the return of any nocturnal emiſſion. The ſtrengthening ointment, directed in page 240 of the Medical Part of my work, was uſed every other morning; and within the ſpace of only two months, the ſeminal veſſels were completely braced up, and the diſorder ſo totally removed, as not to leave a ſingle ſymptom of his former weakneſs.

ONANISM.

A YOUTH, apparently under age, applied to me for the cure of a diſorder, which, he ſaid, had deprived him of the power of erection, and of all ſenſation in the privities. In ſo young a ſubject, I could not ſuppoſe this want of tone to ariſe from a general debility of the nervous ſyſtem, particularly as no other ſymptoms warranted the concluſion. I had a ſtrong ſuſpicion it was the effect of Onaniſm, or ſecret venery, which uſually ends in this ſpecies of abſolute impotency; but this he denied. He told me he had ſome time ago contracted the foul diſtemper, and through ſhame, and the dread of its coming to the knowledge of his friends, he had neglected to diſcloſe his misfortune to any perſon, until the preſent malady was brought on. Of the foul diſtemper, however, I could find no other ſymptom than a ſimple gleet; and, upon putting the neceſſary queſtions, not a ſingle reply corre-

ſponded

ſponded with the uſual effects of that diſorder. After half an hour's cloſe examination, I brought him to confeſs what I above ſuſpected, that he had ſo much addicted himſelf to this ſhameful and deſtructive vice, that the ſeminal veſſels were completely relaxed; the erectories, the nerves, and glans, of the penis, had entirely loſt their tone; an involuntary diſcharge of the ſemen, without irritation, or turgidity of the parts, had long taken place, and brought on a want of appetite, an impoveriſhed ſtate of the blood, and an univerſal laſſitude of the body. The lecture I gave him upon this occaſion, will never, I truſt, be effaced from his memory; and he has ſince faithfully promiſed that it ſhall not. I directed the ſtrengthening electuary and ointment, in page 239 and 240 of the Medical Part of this Work, to be uſed as therein preſcribed; then to take, four times a-day, a table-ſpoonful of the Solar Tincture in an equal quantity of warm water, for a month at leaſt; then three times a-day for the ſecond month, and twice a-day, in cold ſpring-water, for the two months following; which gradually coiled up the debilitated parts, gave elaſticity to the blood, retrieved the ſenſation of the glans, and the ſympathetic office of the erectories, braced the nerves, ligaments, and tendons, and gave that due tone and energy to the muſcular ſyſtem, which in leſs than four months reſtored the patient to perfect health and vigour.

An IMPURE or TAINTED HABIT.

THIS malady, ſo common among our diſſipated youth, generally ariſes from a venereal complaint badly cured. Indeed the ſcrophula, the king's evil, the leproſy, and other foul humours, when too long ſuffered to prey upon the blood, will naturally induce this conſequence; yet ninety-nine caſes out of every hundred, are found to reſult from the improper uſe of mercury, either taken too abundantly into the ſtomach, or too often applied externally, in the venereal diſeaſe. A gentleman in the militia very lately came to me under this misfortune, who had abſolutely worn down the organs of his ſtomach by taking medicines for its cure, without obtaining the ſmalleſt relief. He was no ſooner warm in bed, than deep-ſeated nocturnal pains attacked his arms, ſhins, and head, which many of the faculty miſtook for rheumatiſm. The membranes, muſcles, and ligaments, of the joints, were ſcarcely ever free from pain; whilſt carious ulcers occaſionally broke out upon the ulna, tibia, and bones of the cranium. Theſe ſymptoms had alſo deceived ſeveral of the faculty, who, taking his complaint to be a confirmed lues, ſtill added to the malady, by loading him with freſh doſes of mercury. The truth is, that this diſorder was by no means of a venereal nature, but was rather the conſequence of the remedy than of the diſeaſe, ſince it aroſe entirely from the long and repeated doſes of mercury his body had ſuſtained, and which was grounded in his habit by ſalivation.

ſalivation. The mercury had inſinuated itſelf into the marrow of his bones, had vitiated every fluid ſecretion, and tainted the very air he breathed. Under ſuch circumſtances I will allow, it is very difficult, if not almoſt impoſſible, for a phyſician, upon a ſuperficial inſpection, abſolutely to decide, whether the original diſeaſe hath been altogether overcome; yet ſurely he ought attentively to diſtinguiſh and conſider the ſeveral ſymptoms apart; and then, by comparing them with each other, a clear judgment may be formed upon the general review. Finding, by this method, the real ſtate of the patient's caſe, I ordered him a nouriſhing diet, gentle exerciſe, and an abſolute denial of the ſmalleſt intercourſe with women. To this he readily ſubmitted, putting himſelf under a regular courſe of the Solar Tincture, which he took three times a-day, in the quantity of a wine-glaſs three parts full, filled up with warm water, for the firſt month. At the expiration of this time he paid me a viſit, when his company was infinitely *more agreeable*, becauſe the pleaſing odour of health had ſuperſeded the nauſeous effluvia of his diſeaſe. I now only enjoined him to follow the ſame regimen and *abſtemious* mode of living for a month or two longer, taking the Tincture diluted in a glaſs of cold ſpring-water once or twice a-day, as he might find himſelf inclined. This he rigidly attended to; and I have now the pleaſure to declare, that only nine large bottles of the Solar Tincture have reſtored this gentleman from the moſt dangerous and deplorable ſtate of a tainted and corrupted habit, to ſound health, and a renovated ſtate of the blood and juices.

A TAINTED HABIT IN A STATE OF PREGNANCY.

THIS is the moſt ſhocking caſe my practice or experience ever produced. The patient was taken in labour, and in the act of parturition, the child preſented its right arm, which ſeparated from the body, while the operator was returning it into the womb. The life of the mother being deſpaired of, I was ſent for; when, on inſpection, I quickly perceived conception had taken place under an infected ſtate of one of the parents. I performed the reſidue of the operation myſelf, and brought away the fœtus without a further ſeparation of the joints, but with great difficulty, ſince it was ulcerated and half rotten with diſeaſe. By a moſt tender and judicious treatment of the woman, aſſiſted by the Lunar Tincture, her life was preſerved; and in the ſpace of five weeks ſhe appeared to have regained her health and ſtrength; when, to the aſtoniſhment of every one, ſhe fell into a violent ſalivation. Being ſent for upon this ſingular occaſion, I thought it right to interrogate the huſband; when, after a vaſt deal of heſitation and diſſembling, he confeſſed having had connection with his wife under a venereal infection; and, with a view to prevent the conſequences, he had prevailed on her to ſwallow ſtrong doſes of mercury, which I have reaſon to ſuppoſe lay dormant in the body until after her delivery; when the efforts

efforts of nature being no longer directed to the preſervation of the child, ſuffered the mercury to attack the ſalival glands, and to produce the effect we have juſt deſcribed. I ordered her a ſpare but nouriſhing diet; worked off the mercury in the cuſtomary way, and then began a courſe of the Solar Tincture. A table-ſpoonful, in an equal quantity of warm water, was taken four times a-day for the firſt week; then three times a-day until the end of the month; afterwards twice a-day in cold ſpring-water for a month longer; and then once or twice a-day, or every other day, as the patient found convenient; by this means ſhe happily experienced a complete cure in leſs than three months, and now enjoys a perfect ſtate of health, deſirous of certifying the fact to any unfortunate female, who, under ſimilar circumſtances, wiſhes to call upon me for that purpoſe. Indeed every woman, who has the misfortune to ſuſpect even the ſmalleſt taint of a ſimilar nature to be lurking in her blood, ſhould put herſelf under a courſe of the Solar Tincture, and perſiſt in it every night and morning, in the quantity of a table-ſpoonful diluted in a wine-glaſs of cold ſpring-water, during the whole nine months ſtate of pregnancy.

The above caſe brings to my recollection a very ſingular inſtance of an accidental ſalivation, brought upon a young lady by a foreign ſubſtance irritating one of the parotid glands; the particulars of which I ſhall here inſert, for the ſake of thoſe who may happen to be under ſimilar circumſtances.—In the month of April, 1751, a young lady, about the age of ſixteen years, of a delicate habit, but ſubject to no particular complaints, perceived the beginning of a diſeaſe which afterwards proved moſt obſtinate and loathſome, viz. an inceſſant ſpitting. The quantity of this diſcharge was different at different times, varying from one pint to two pints and a half in twenty-four hours. As to its quality, it ſeemed to be no other than the ordinary ſecretion of the ſalival glands. By ſo large and conſtant an evacuation, her ſtrength became extremely impaired; and the moſt efficacious medicines had proved uſeleſs. She had taken large quantities of the Peruvian bark, both alone and combined with preparations of iron; and afterwards the fetid gums, opium, amber, alum, and the Neville-Holt water, had in ſucceſſion been given her. In the mean time an exact regimen had been preſcribed, ſhe had been ordered to ride conſtantly; and to confine herſelf to a mucilaginous diet, ſuch as veal, calves' feet, &c. Likewiſe a gently-opening medicine had now and then been interpoſed. The diſeaſe ſtill continued unaltered; ſhe had afterwards tried the *tinctura ſaturnina*; and had, at the ſame time, been encouraged to chew the Peruvian bark, and to ſwallow the ſaliva. But all theſe attempts had been vain; and after ſhe had taken ſome or other of the medicines above-mentioned until the end of September, 1753, namely, above two years, it appeared to her phyſician, Sir George Baker, unreaſonable to expect relief in ſuch a caſe from any internal medicines whatever. He

now conceived a ſuſpicion, that ſome extraneous body, having accidentally found its way into the *meatus auditorius*, might poſſibly be the cauſe of this extraordinary ſecretion, by keeping up a continued irritation in the parotid glands. With this view he examined her ears, and extracted from them a quantity of fetid wool. How, or when, it came thither, no account could be given. To this ſubſtance he attributed the beginning of the ſalivation, notwithſtanding that the diſeaſe did not immediately abate on the removal of the wool; as it appeared to be no improbable ſuppoſition that the diſcharge might be continued by the force of habit, though the original cauſe no longer remained. It ſeemed therefore expedient to introduce ſome other habit, in the place of the increaſed ſecretion of ſaliva; which habit might afterwards be gradually left off. With this intention, he prevailed on the patient to chew perpetually a little dry bread, and to ſwallow it with her ſpittle. In a few weeks, it became neceſſary for her to chew the bread only at certain hours in the day; and thus, after two months, ſhe became entirely free from a moſt diſguſtful and tedious diſorder. It is worthy of obſervation, that, at firſt, the ſwallowing of ſo much ſaliva frequently occaſioned a nauſea; and that then, for a few hours, ſhe was obliged to ſpit it out as uſual; and that, during the greateſt part of the time, when ſhe chewed the bread, ſhe had a ſtool or two every day more than common.

TABES DORSALIS, OR CONSUMPTION OF THE BACK.

A YOUNG gentleman, twenty-two years of age, applied to me in the above diſorder, which had worn him down to a mere ſkeleton. The tabes is ſeldom diſtinguiſhed by any remarkable fever, cough, or difficulty of breathing; but is attended with want of appetite, a weak digeſtion, and a morbid ſtate of the blood, whence the body grows languid, and waſtes by degrees. Sometimes this ſpecies of conſumption is brought on by a venereal ulcer; but it moſt commonly proceeds from exceſſive evacuations of the ſemen, which was the caſe with this patient. He had too early addicted himſelf to an intercourſe with lewd women, which eventually brought on an involuntary ſhedding of the ſeed, which came from him on the leaſt exertion, whether of walking, riding, lifting a weight, or even of pulling off his clothes.—I ordered him a ſtrong nutritious diet, with a table-ſpoonful of the Solar Tincture four times a-day, in the ſame quantity of warm water, which he purſued for a month. He found his ſtrength was ſo much recovered, that I could ſafely adviſe moderate exerciſe both on horſeback and on foot. The gleet, however, was uncommonly obſtinate; and the Tincture was continued for the ſecond month in the ſame quantity. By this time the parts were conſiderably braced; he could run or jump without perceiving the ſmalleſt emiſſion; and the healthful colour of his cheek

cheek began to return.—He now perſiſted in the Tincture, only three times a-day, for a month longer; after which the doſe was reduced to night and morning for another month; he then took it twice a-day for two months more, at the end of which period every ſymptom of the complaint was removed, he had fully recovered his fleſh and ſtrength; and now preſerves it by taking the Solar Tincture as a beverage, made after the manner of brandy and water. This diſorder has in general been deemed incurable. It is true, that even in its early attacks, it is ſo eſſentially neceſſary to abſtain from venereal embraces, that, without it, the beſt remedies will prove altogether uſeleſs; hence the tabes dorſalis ſo often proves mortal, becauſe the patient has ſeldom reſolution enough to diſpenſe with his amours.

RHEUMATIC GOUT.

THIS diſeaſe is generally brought on by alternate heats and colds in the blood, whereby a humour is produced which attacks the joints and muſcles, ſometimes accompanied with diſcolorations and ſwellings, and at other times without either; but it is always attended with excruciating pain. Mr. John Brandham, of Bridlington Quay, was attacked in this manner; when, after ſome time, the ſevere pain of his joints, falling into his legs and thighs, deprived him of the uſe of his limbs, and confined him entirely to his bed. He was ſoon after ſeized with a violent pain in his head and ſtomach, which ſo much affected his reſpiration, that inſtant death was expected. In this extremity, half a wine-glaſs of the Solar Tincture was adminiſtered, *undiluted*, which removed the danger, and gave his ſtomach immediate eaſe. A table ſpoonful, in the ſame quantity of warm water, was then given every third hour during the ſucceeding day and night, by which the pains were conſiderably abated. He continued the medicine four times a-day for a month longer; at the expiration of which time he experienced a perfect cure, and has never ſince found the ſmalleſt return of his complaint; of which he is deſirous of ſatisfying any enquirer, who chooſes to apply for that purpoſe.

AGUES, CONVULSIONS, CHOLIC, BLOODY-FLUX, and VIOLENT SPASMS IN THE STOMACH AND BOWELS.

DURING the fit, let one or two table-ſpoonfuls of the Solar Tincture, *undiluted*, be adminiſtered ſucceſſively, as the extremity of the caſe may require; and afterwards let the patient continue the medicine, night and morning, in the quantity of a table-ſpoonful in a wine-glaſs of warm water, or oftener, as the obſtinacy of the caſe may render neceſſary, and in a very ſhort time a perfect cure will be experienced; a few inſtances of which I ſhall add, in the words of thoſe who have tranſmitted me the facts.

To

To E. SIBLY, M. D.

SIR,—A few nights ago, I was attacked in bed with a violent pain in my ſtomach and bowels, which alternately produced ſuch a ſucceſſion of convulſive ſpaſms and cold chills, that I really thought I was ſeized for death. Fortunately a bottle of your Solar Tincture was in the houſe, purchaſed the day before by my ſon, of which my ſervant gave me a table-ſpoonful and a half, unmixed with water. The inſtant effect it had on my ſtomach, I could only compare to electricity; for, to the aſtoniſhment of all about me, the ſpaſms inſtantly ceaſed, a gentle perſpiration came on, in which ſtate I fell aſleep, and did not awake till the morning, when I found myſelf entirely free from pain. On getting up, I took a ſpoonful more of the Tincture in an equal quantity of warm water; and have not ſince experienced the ſmalleſt return of the diſorder. Requeſting you will make this known, for the benefit of others, I remain, with grateful eſteem, &c.

No. 25, Philpot-lane, Fenchurch-ſtreet, Feb. 12. M. ARMSTRONG.

To E. SIBLY, M. D.

SIR,—In gratitude, I cannot but thank you for that excellent medicine, the Solar Tincture. It has ſaved my life. I was ſuddenly ſeized with a violent cholic, which brought on a mortification of the bowels. The efforts of the faculty were tried in vain, and I was given over. In theſe moments of extremity, my exiſtence was preſerved by only two ſpoonfuls of your medicine, *undiluted*, which inſtantly relieved me from the rack of torture. After two more doſes, the obſtruction was removed by natural evacuation, and a few hours reſtored me to my uſual ſtate of good health. I intreat you to publiſh this for the public good, and ſhall be ever gratefully your's,

Clifton, near Briſtol, Feb. 24. JOHN POWELL.

To E. SIBLY, M. D.

SIR,—Actuated by a principle of gratitude, I cannot omit acquainting you of an extraordinary cure performed on me by means of your Solar Tincture.—I had for ſome time been afflicted with the dyſentery or bloody-flux, and was reduced to a very weak and languid ſtate, without deriving any benefit from the preſcriptions of the faculty. This induced me to make trial of your Solar Tincture; when, after taking only two ſmall bottles, I found myſelf perfectly recovered; therefore, by publiſhing this to the world, you will confer a favour on your grateful, &c.

WILLIAM JACKSON.

No. 8, *Windmill-ſtreet, Tottenham-court-road, May* 15.

DISEASES

DISEASES OF THE BREAST AND LUNGS, ASTHMA, DROPSY, OR CONSUMPTION.

TAKE one ſpoonful of the Tincture, night and morning, for twenty days ſucceſſively, diluted in two ſpoonfuls of cold ſpring-water; then reduce it to the ſame doſe every other day, which will in general remove the malady in the courſe of a month; but, if the dropſy or conſumption have been far advanced, it will be neceſſary to continue the medicine for one, two, or even three, months longer, reducing the number of doſes in proportion as health and ſtrength appear to return, and as the blood ſhall have reſumed its proper conſiſtency, and a briſker circulation. In theſe complaints, it will not be amiſs to take the Tincture in a tumbler of warm water, as a beverage, for ſome time after the cure is perfected, as it will infallibly prevent the blood from returning to its watery and impoveriſhed ſtate, and will rarefy and expel the viſcid coheſions in the pulmonary veſſels. In theſe diſorders, the Solar Tincture may be ſafely admiſtered to females even during obſtructions of the catamenia, as hath lately been experienced by perfecting an admirable cure on a lady in Grafton-ſtreet.

This lady was afflicted with obſtructions of the liver and ſpleen, inſomuch that ſhe could not walk up one pair of ſtairs without much pain, and ſhortneſs of breath. Her menſes were obſtructed; and twice or thrice a-day ſhe was attacked with aſthmatic ſpaſms, accompanied with febrile ſymptoms. This affliction being of a peculiar nature, I was obliged to preſcribe both the Solar and Lunar Tinctures, in the following manner: Whenever the fever came on, ſhe took a doſe of the Solar Tincture; and every morning and evening, ſixty drops of the Lunar Tincture in a gill of mugwort tea; and in twenty-one days ſhe was perfectly recovered, and reſtored to her uſual colour and vivacity, to the great joy of her parents and friends.

MENTAL DEPRESSION, OR LOWNESS OF SPIRITS.

THIS may be conſidered the primary diſorder of the nervous train; and, if reſiſted in time, may in moſt caſes be eaſily cured. For this purpoſe take a table-ſpoonful of the Solar Tincture, diluted in a wine-glaſs of cold ſpring-water, every forenoon at eleven or twelve o'clock, for fourteen ſucceſſive days; then uſe it in every two or three days for a month, and the complaint will be entirely removed, as all patients will ſenſibly feel, by their alertneſs, activity, and unuſual flow of natural ſpirits; of which the following caſe may ſerve as an example:

To E. SIBLY, M. D.

SIR,—From a full conviction of the efficacy of your Solar Tincture, I cheerfully come forward to inform you, that, having been much afflicted with depreſſion of

ſpirits, a nervous tremor, and palpitation of the heart, (owing, I believe, to cloſe application to ſtudy, and much profeſſional duty,) I have lately experienced a perfect cure, by taking one large bottle of your medicine. Impreſſed, therefore, with a ſenſe of gratitude to God and you, and having a certain knowledge of many other cures performed by your Tincture, I do hereby requeſt this may be made public for the benefit of the afflicted, and am with eſteem, &c.

Borough, Southwark, March 10. W. WOOLLEY, M. A.

BILE ON THE STOMACH.

ALL bilious complaints are removed by the Solar Tincture in a moſt extraordinary manner. Whenever a fit appears to be coming on, with the ſtomach loaded and oppreſſed, one large table-ſpoonful, taken in the ſame quantity of warm water, will in ten minutes carry off the offending matter, cleanſe and comfort the digeſtive organs, and give the patient immediate relief.

BITE OF A MAD DOG, OR ANY VENOMOUS REPTILE.

THE fatal diſeaſe conſequent on the bite of a mad dog, is the *hydrophobia,* or "dread of water;" which circumſtance firſt ſuggeſted dipping in the ſea for cure. It is very remarkable that theſe patients have not only a dread of water, but of every thing bright or tranſparent. Soon after this affection takes place, the mind becomes impaired; which ſhows that the poiſon is carried through the blood to the nervous fluid, and thence to the brain. Dr. James, in his Treatiſe on Canine Madneſs, mentions a boy ſent out to fill two bottles with water, who was ſo terrified by the noiſe of the liquid running into them, that he fled into the houſe crying out that he was bewitched. He mentions alſo the caſe of a farmer, who, going to draw ſome ale from a caſk, was terrified to ſuch a degree at its running into the veſſel, that he ran out in great haſte with the ſpigot in his hand. But, in whatever manner this ſymptom comes on, it is certain that the moſt painful ſenſations accompany every attempt to ſwallow liquids. Nay, the bare ſight of water, of a looking-glaſs, of any thing clear or pellucid, will give the utmoſt uneaſineſs, or even throw the patient into convulſions. In this diſeaſe there ſeems to be an extreme ſenſibility and irritability of the nervous ſyſtem. The eyes cannot bear the light, nor the ſight of any thing white; the leaſt touch or motion offends them, and they want to be kept as quiet and in as dark a place as poſſible. Some complain of the coldneſs of the air, frequently when it is really warm. Others complain of violent heat; and have a great deſire for cold air, which yet never fails to increaſe the ſymptoms. In all there is a great flow of the ſaliva into the mouth; which is exceedingly troubleſome to the patients, as it has the ſame effect upon their fauces that other liquids

have. This therefore they perpetually blow off with violence, which in a patient of Dr. Fothergill's occaſioned a noiſe not unlike the hollow barking of a dog, and which he conjectures might have given riſe to the common notion that hydrophobious patients bark like dogs. They have an inſatiable thirſt; but are unable to get down any drink, except with the utmoſt difficulty; though ſometimes they can ſwallow bread ſoaked in liquids, ſlices of orange, or other fruits. There is a pain under the *ſcrobiculus cordis*, as in the tetanus; and the patients mournfully point to that place as the ſeat of the diſeaſe. Dr. Vaughan is of opinion that it is this pain, rather than any difficulty in ſwallowing, which diſtreſſes the patient on every attempt to drink. The voice is commonly plaintive and mournful; but Dr. Vaughan tells us there is a mixture of fierceneſs and timidity in the countenance which he cannot deſcribe, but by which he could know a hydrophobious perſon without aſking any queſtions. Some ſeem to have at times a furious delirium, and an inclination to ſpit at or bite the by-ſtanders; while others ſhow no ſuch inclination, but will even ſuffer people to wipe the inſide of their mouths with the corner of a handkerchief in order to clear away the viſcid ſaliva which is ready to ſuffocate them. In ſome male patients there is an involuntary erection of the penis, and emiſſion of the ſemen; and the urine is forced away by the frequent return of the ſpaſms.

In a letter from Dr. Wolf, of Warſaw, to Henry Baker, F. R. S. dated Warſaw, Sept. 26th, 1767, we have the following melancholy account of the caſes of five perſons who died of the hydrophobia: None of them quite loſt their ſenſes; but they were all talking without intermiſſion, praying, lamenting, deſpairing, curſing, ſighing, ſpitting a frothy ſaliva, ſcreeching, ſometimes belching, and retching, but rarely vomiting. Every member is convulſed by fits, but moſt violently from the navel up to the breaſt and œſophagus. The fit comes on every quarter of an hour; the fauces are not red, nor the tongue dry. The pulſe is not at all feveriſh; and, when the fit is over, nearly like a ſound pulſe. The face grows pale, then brown, and during the fit almoſt black; the lips livid; the head is drowſy, and the ears tingling; the urine limpid. At laſt they grow weary; the fits are leſs violent, and ceaſe towards the end; the pulſe becomes weak, intermittent, and not very quick; they ſweat, and at laſt the whole body becomes cold. They compoſe themſelves quietly as if to get ſleep, and ſo they expire. A general obſervation was, that the lint and dreſſings of the wounds, even when dry, were always black, and that when the pus was very good in colour and appearance. In one of Dr. Wolf's patients who recovered, the blood ſtank intolerably as it was drawn from a vein; and one of Mr. Vaughan's patients complained of an intolerable fœtid ſmell proceeding from the wounded part, though nobody but himſelf could perceive it. In general, the violent convulſions ceaſe a ſhort time before death; and even the hydrophobia

goes

goes off, ſo that the patients can drink freely. But this does not always happen; for Mr. Vaughan mentions the caſe of a patient, in whom, "when he had in appearance ceaſed to breathe, the ſpaſmus cynicus was obſervable, with an odd convulſive motion in the muſcles of the face; and the ſtrange contrariety which took place in the action of theſe produced the moſt horrid aſſemblage of features that can well be conceived. Of this patient alſo it was remarkable, that in the laſt hours of his life he ceaſed to call for drink, which had been his conſtant requeſt; but was perpetually aſking for ſomething to eat."

The hydrophobia ſeems to be a ſymptom peculiar to the human race; for the mad animals which communicate the infection do not ſeem to have any dread of water. Notwithſtanding this, dipping is the common remedy for the cure of dogs and men. With regard to the ſymptoms of madneſs in dogs, they are very equivocal; and thoſe particularly enumerated by ſome authors, are only ſuch as might be expected in dogs much heated or agitated by being violently purſued and ſtruck. One ſymptom indeed, if it could be depended upon, would determine the matter; namely, that all other dogs avoid and run away from one that is mad; and even large dogs will not attack one of the ſmalleſt ſize who is infected with this diſeaſe. Upon this ſuppoſition they point out a method of diſcovering whether a dog, who hath been killed, was really mad or not; namely, by rubbing a piece of meat along the inſide of his mouth, and then offering it to a ſound dog. If the latter eats it, it is a ſign the dog was not mad; but, if the other rejects it with a kind of howling noiſe, it is certain that he was. Dr. James tell us, that among dogs the diſeaſe is infectious by ſtaying in the ſame place; and that, after a kennel has been once infected, the dogs put into it will be for a conſiderable time afterwards in danger of going mad alſo. A remedy for this, he ſays, is, to keep geeſe for ſome time in the kennel. He rejects as falſe the opinion that dogs when going mad will not bark; though he owns that there is a very conſiderable change in their bark, which becomes hoarſe and hollow.

With regard to the immediate cauſe among mankind, there is not the leaſt doubt that the hydrophobia is occaſioned by the ſaliva of the mad animal being mixed with the blood. It does not appear that this can operate through the cuticula; but, when that is rubbed off, the ſmalleſt quantity is ſufficient to communicate the diſeaſe, and a ſlight ſcratch with the teeth of a mad animal has been found as pernicious as a large wound. It is certain alſo, that the infection has been communicated by the bites of dogs, cats, wolves, foxes, weaſels, ſwine, and even cocks and hens, when in a ſtate of madneſs. But it does not appear that the diſtemper is communicable from one hydrophobious perſon to another, by means of the bite, or any other way.

It has been generally allowed by practitioners, that, though the hydrophobia may be prevented, yet it can seldom be cured after the disease has made its appearance. The most essential part of the treatment therefore depends on an immediate use of the proper means of prevention. For this purpose some advise the instant cutting out the part bitten, which must certainly be an effectual mode, provided we could be sure the poison had not reached beyond the wound. When, however, we consider the rapidity with which the blood and juices flow, it seems impossible we can ever wholly depend on such an operation. I should nevertheless advise it to be done; after which let the part be well soaked with the Solar Tincture; and, to fortify the blood, let the patient immediately swallow a table spoonful every three hours, *undiluted*, for the first day; and the same dose night and morning, for a month following. Let the part be again soaked with the Tincture four times a-day, for three or four days; and I am satisfied a safe and perfect cure may be relied on. For the bite of adders, snakes, &c. bathing the part, and taking the medicine *undiluted*, will counteract the virulence of the poison, and preserve the patient from further injury.

For GUN-SHOT WOUNDS, CUTS, STABS, &c.

GENTLEMEN in the army and navy, and all persons liable to gun-shots, stabs, wounds, &c. should never be without the Solar Tincture. Its salutary effects on the blood, in all these cases, are really surprising. It totally prevents, and will even stop, mortification, in very advanced stages. It quickly supplies the greatest loss of blood; fortifies the heart, cherishes the vital organs, and heals and unites the flesh in an uncommon degree. If taken internally, and poured at the same time into the wound, it is quickly propelled through the heart by the veins and arteries; and thus renovates the exhausted spirits, and preserves life. Its effect on a few simple wounds may be seen in the following cases.

To E. SIBLY, M. D.

SIR,—For the sake of those liable to accidents, I think it right to inform you of a most remarkable cure performed by your Solar Tincture, on a very deep and dangerous wound made on Mrs. Cook by a case-knife, of more than the depth of my fore-finger. After trying every means in vain to stop the blood, I sent for a bottle of your Solar Tincture, and well bathed the wound therewith. The blood and Tincture readily assimilated, and formed a crust on the orifice of the wound, which very soon stopped the effusion of blood. But what is most remarkable, the wound was completely healed in less than six days, and is now so perfectly closed, as to be almost imperceptible. You are welcome to publish this, and in so doing will oblige, &c.

Seymour-street, Portland-square, April 14. WILLIAM COOK.

To E. SIBLY, M. D.

SIR,—In juſtice to my own feelings, I cannot but acquaint you with a cure performed by your Solar Tincture, in a very uncommon manner. As I was travelling in the ſtage to Boxley-Abbey, near Maidſtone, in Kent, a gentleman, who ſat next me, putting his head out of the window, received a violent cut acroſs the eye with the coachman's whip, which produced an immediate ſwelling and inflammation, attended with ſo much agony, that he declared the pain was inſupportable. I had purchaſed a bottle of your Solar Tincture while in town, knowing it had performed many ſurpriſing cures in my neighbourhood. This I immediately opened, and applied to the inflamed part; and, after waſhing the eye well with it, I bound a white handkerchief tight over it, wetted with the Tincture. In leſs than ten minutes the anguiſh was greatly aſſuaged; and in the courſe of three hours it was quite well. The gentleman expreſſed the utmoſt aſtoniſhment at the celerity of the cure, as did every paſſenger in the coach. I wiſh this to be made as public as poſſible, for the benefit of thoſe who are liable to accidents; and am with reſpect, &c.

M. STABLES.

I ſhall only remark further, with reſpect to wounds, bruiſes, &c. that a ſhort time ago, as a coach was driving furiouſly out of Cavendiſh-ſquare, the horſes unfortunately beat down a girl of eight years of age, the daughter of Robert and Elizabeth Larken, of Clipſton-ſtreet; and, the wheels paſſing over her body, ſhe was taken up to all appearance dead. The ſpectators were for carrying her immediately to the hoſpital; but, the accident happening very near my houſe, I was ſent for. I avoided letting blood, but bathed the bruiſed parts thoroughly with the Solar Tincture, and introduced half a ſpoonful, *undiluted*, into her ſtomach. It was now about nine o'clock at night. She was compoſed and aſleep before ten, being overcome by the medicine. A ſpoonful more of the Tincture was given her at different periods of the night, the ſudorific power of which brought on a plentiful perſpiration. At ten o'clock the next morning ſhe awoke, and got up, and was ſo well recovered as to be able to play about with her companions, in all reſpects the ſame as if nothing had happened. The girl, and her parents, are pleaſed with every opportunity of recounting the circumſtances of this event, to any enquirers.

Let it not be ſaid, that, becauſe this medicine appears to be preſcribed for many diſorders, it can be good for none.—I affirm, that every complaint for which it is recommended, *originates in the blood*, or in *obſtructed perſpiration*. The action of the Solar Tincture is on the blood and juices; it ſtrikes at the root, not at the branches; by which peculiar advantage it effects a cure when other medicines fail. And, though there is a medicine, ſold in regular practice at a guinea an ounce, which

which poſſeſſes no one virtue comparable to the Solar Tincture; yet the proprietor, unwilling to adopt ſuch examples, or to withhold from the afflicted in every line of of life the benefits of his diſcovery, has determined to render it to the public at only 7s. 6d. the ſmall, and 13s. the large, bottles, duty included, with ample directions in every complaint for which it ought to be adminiſtered.—A ſingle bottle will in many caſes perform a ſpeedy cure, when, in the ordinary courſe of medical practice, it would occupy a month, and coſt many pounds for unneceſſary attendance, and exceſs of drugs.

OF THE

PRINCIPLES

OF

LIFE AND DEATH.

LIFE denotes the animated ſtate of nature; and, in human beings, exiſts as long as an union of the ſoul and body laſts. With us, therefore, life continues, until ſuch ſeparation has really taken place; which can no more be ſaid to have happened during the paroxiſm of a fit, or of a blow which for a time deprives us of ſenſation, or in the *early* period of an unnatural or ſudden death, than during the time we are aſleep. It is the want of proper ſkill at ſuch times that too often occaſions death to take place, when life abſolutely exiſts in the blood, and might with little care have been preſerved. Death is therefore the act of ſeparation of the ſoul from the body; in which ſenſe it ſtands oppoſed to life, which conſiſts in the union thereof. An animal body, by the actions inſeparable from life, undergoes a continual change, and receives its diſſolution by degrees. Its ſmalleſt fibres become rigid; its minuter veſſels

veſſels grow into ſolid fibres no longer pervious to the fluids; its greater veſſels grow hard and narrow; and every thing becomes contracted, cloſed, and bound up: whence the dryneſs, immobility, and extenuation, obſerved in old age. By ſuch means the offices of the minuter veſſels are deſtroyed; the humours ſtagnate, harden, and at length coaleſce with the ſolids. Thus are the ſubtileſt fluids in the body intercepted and loſt, the concoction weakened, and the reparation prevented; only the blood continues to run ſlowly through the greater veſſels, aſſiduous to preſerve life, even after the animal functions are deſtroyed. At length, in the proceſs of theſe changes, death becomes inevitable, as the neceſſary conſequences of life, But it is rare indeed that life is thus long protracted, or that death ſucceeds merely from the natural decays and impairment of old age. Accidental diſeaſes, and our neglect of preſerving health, cut the work ſhort.

The ſigns of death are often very uncertain. If we conſult what Winſlow or Bruchier have ſaid on this ſubject, we ſhall be convinced, that between life and death the ſhade is ſo very undiſtinguiſhable, that even all the powers of art can ſcarcely determine where the one ends and the other begins. The colour of the viſage, the warmth of the body, and ſuppleneſs of the joints, are but uncertain ſigns of life ſtill ſubſiſting; while, on the contrary, the paleneſs of the complexion, the coldneſs of the body, the ſtiffneſs of the extremities, the ceſſation of all motion, and the total inſenſibility of the parts, are but uncertain marks of death begun. In the ſame manner alſo, with regard to the pulſe and breathing; theſe motions are ſo often kept under, that it is impoſſible to perceive them. By bringing a looking-glaſs near to the mouth of the perſon ſuppoſed to be dead, people often expect to find whether he breathes or not. But this is a very uncertain experiment: the glaſs is frequently ſullied by the vapour of the dead man's body; and often the perſon is ſtill alive, though the glaſs is no way tarniſhed. In the ſame manner, neither noiſes in the ears, nor pungent ſpirits applied to the noſtrils, give certain ſigns of the diſcontinuance of life; and there are many inſtances of perſons who have endured them all, and afterwards recovered without any external aſſiſtance, to the aſtoniſhment of the ſpectators. This ſurely ought to be a caution againſt haſty burials, eſpecially in caſes of ſudden death; for it is ſhocking to reflect, that ſome hundreds of valuable members of ſociety are annually torn from their diſconſolate families by ſome accidental ſudden cauſe, and hurried thoughtleſsly to the grave, in whom the principles of life were capable of being revived! This lamentable truth has been eſtabliſhed by the happy ſucceſs of the Humane Society, from whoſe laudable exertions ſeveral hundred perſons have been reſtored to life, who, to all viſible appearance, *were paſt recovery*. Every age and country affords ſome inſtances of perſons having been recovered, even after lying long for dead; and from the number of

thoſe preſerved by mere lucky accidents, it is evident ſtill greater numbers might be ſaved by timely pains and ſkill. Thoſe who have contemplated the ſtructure of the human machine know, that its diſſolution cannot *naturally* happen but by that gradual decay of the whole ſyſtem above deſcribed, when the veſſels are become impervious to the fluids, the circulation weakened or deſtroyed, and the vital organs no longer able to perform their office. But, when their functions are merely ſuſpended by ſome ſudden ſhock, it may be likened to the ſtate of a watch ſtopped by a fall, which reſumes its motion the inſtant that injury is repaired. In the animal œconomy, "*the BLOOD is the LIFE;*" Levit. xvii. 11, 14. Deut. xii. 23. therefore, if its circulation be ſuſpended or deſtroyed, death follows. But, if the blood can be re-agitated, and its circulation reſumed, life will of neceſſity be reſtored. For this reaſon, whenever any accident has happened, by which ſudden death appears to have taken place, whether by blows, fits, falls, ſuffocation, ſtrangulation, drowning, apoplexy, convulſion-fits, thunder and lightning, aſſaſſination, duelling, or the like, let the unfortunate perſon be carried into a warm houſe, and laid by the fire, or put into a warm bed; let two or three table-ſpoonfuls of the Solar Tincture be introduced as early as poſſible into the ſtomach, and rubbed profuſely in, by a warm hand, upon the ſpine of the back, loins, breaſt, and region of the heart, and poured into the wound, if there be any; the warm ſtimulating quality of the medicine, aſſiſted by the external heat and friction, will quickly rouſe the ſtagnant blood and juices, particularly in the grand reſervoir the heart, where, rarefying, preſſing every way, and being reſiſted by the valves, it will ſwell ſo as to fill the flaccid right auricle of the heart, which by the ſhock had become empty and at reſt; and thus, ſtimulating its fibres, will put them in motion. The right auricle being thus filled, and ſtimulated into contraction, fills the ventricle; which, by this means being irritated, likewiſe contracts and empties itſelf into the pulmonary artery; and, the moment this is done, the circulation begins again where it left off; and the lungs, being filled by the dephlogiſticated air contained in the medicine, begin to act, and life is reſtored, provided the organs and juices are in a fit diſpoſition for it; which they undoubtedly are much oftener than is imagined. Nor is this ſtimulating action of the Tincture upon the heart at all ſurpriſing; for every medical man knows, or ought to know, that the heart, even when taken out of the body, if it be pricked with a pin, or hath warm water thrown upon it, will beat afreſh, and endeavour to exert its functions, though for ſome time before it had been motionleſs. No perſon therefore ought to be conſidered *dead*, until the energy of the blood is ſo far gone, that it can never again be agitated ſo as to fill and ſtimulate into contraction the right *ſinus venoſus* and auricle of the heart.

When the patient is thus far recovered, he ought to be treated with great care and tenderneſs; and ſome warm milk, wine and water, elder-flower-tea, or any nouriſhing ſpoon-meat, ſhould be given to him as ſoon as he appears capable of taking food. In ſome caſes it may be neceſſary to open the temporal artery and the external jugular, or to bleed in the arm; but this ſhould never be done, if it can ſafely be diſpenſed with, as it certainly weakens the animal principle, which it is the firſt object of this medicine to ſtrengthen. Under different circumſtances, and as particular occaſions may require, the rules laid down in p. 196 of the Medical Part of this work, and recommended by the Humane Society, will be found of conſiderable advantage. Above all, let me entreat an anxious perſeverance in this ſublimeſt of all virtues—the attempt to recover periſhing lives. Humanity calls for it in the moſt moving accents; and what can inſpire a good heart with more ſincere, perfect, conſcientious, and commendable, ſatisfaction, than a retroſpect of ſuch endeavours as have been generouſly exerted and ſucceſsfully contributed to recover, perhaps to reſtore, the life of a fellow-creature from the moſt deprecated calamity—ſudden death, with its alarming retinue of threatening conſequences to thoſe who die unprepared? ſince, by thus preſerving a ſinner to a future period, perhaps a ſoul may emerge in full maturity to felicity which ſhall have no end!

To demonſtrate the reanimating power of the medicine, experiments may be made upon a fowl, lamb, cat, dog, or other animal, by plunging them under water until they are apparently dead, or piercing them through the head, or any part of the body except the heart; by ſuffocation, or an electrical ſhock: for ſudden death, howſoever it happens, whether by drowning or otherwiſe, is much the ſame as to its effects on the vital organs; conſequently they are all to be treated in a ſimilar manner.

Upon the whole it is evident, that by contemplating the œconomy and harmony of our ſtructure, both external and internal, we may quickly diſcern a proper line of conduct for the conſervation of health, and the prolongation of life; and we ſhall alſo perceive a more auguſt view of the marvellous works of divine wiſdom in the ſtructure of the human frame, than we ſhall perhaps again find in the whole compaſs of nature. The gift of health was evidently the deſign of our benevolent Creator in the conſtruction of our bodies; it is therefore no leſs our duty than our intereſt to preſerve this bleſſing to our lateſt moments, as the ſeaſoning and fund which gives the reliſh to all our other enjoyments. To enumerate the various abuſes of health, which take place from our earlieſt infancy, particularly among the rich and gay, and which are continued through the ſucceeding ſtages of modiſh life, would fill a volume. Suffice it to obſerve, that they prevail more particularly among people who are the moſt highly poliſhed and refined. To compare their artificial mode of living with that of nature, would afford a very ſtriking contraſt,

and ſupply an obvious reaſon why perſons in the lower orders of ſociety are generally the longeſt livers, and enjoy the beſt ſtate of health; and hence we are warranted to conclude, that a large proportion of the diſeaſes to which we are ſubjected are produced by ourſelves.

Notwithſtanding this unaccountable abuſe of our health, yet the want of it unfits us for moſt of the common avocations of life, and is more eſpecially an enemy to the ſocial and humane affections, as it generally renders the unhappy ſufferer peeviſh and ſullen, diſguſted at the allotments of Providence, and apt to induce ſuicide, by ſuggeſting gloomy and ſuſpicious ſentiments of the Almighty. It obſtructs the free exerciſe and full improvement of our reaſon, makes us a burden to our friends, and uſeleſs to ſociety. Whereas the uninterrupted enjoyment of health is a conſtant ſource of good humour, and good humour is a great friend to openneſs and benignity of heart; enables us to encounter the various ills and diſappointments of this world with more courage, or to ſuſtain them with more patience; and, in ſhort, conduces much, if we are otherwiſe duly qualified, to our acting our part in every exigency of life with more firmneſs, conſiſtency, and dignity. Therefore it imports us much to preſerve and improve the habit of its enjoyment, without which every other external entertainment is taſteleſs, and moſt other advantages are of little avail. To this end, we ought above all things to cultivate prudence, temperance, ſobriety, fortitude, and equanimity of temper; for without a prudent care of the body, and a ſteady government of the mind, to guard the one from diſeaſe, and the other from the feuds of paſſion and prejudice, ſound health is unattainable. By *temperance* we enjoy the real gratifications of life, without ſuffering any conſequent inconvenience. Sobriety enables us to be content with ſimple and frugal fare, and protects us from the pain and diſgrace of intoxication. Fortitude enables us to bear thoſe infirmities which prudence and ſobriety cannot ſhun, and baniſhes all dread of imaginary evils from our thoughts. Equanimity of temper contributes greatly to the happineſs of life, as well as to the preſervation of health, by keeping the mind from anxiety and perturbation, and arming us againſt the calumnies and animoſities of human nature. Violent paſſions, and the exceſſes they induce, gradually impair and wear away the conſtitution; whilſt the calm and placid ſtate of a temperate mind, and the healthful exerciſe of the body, preſerve the natural functions in full vigour and harmony, and exhilarate the ſpirits, which are the chief inſtruments of action. The worſt conſequences that could poſſibly reſult from a ſtrict adherence to this regimen, would be that of exterminating a ſwarm of locuſts, and rendering the diſcovery of my medicine of leſs importance to the community.

Of the CRISIS, or CRITICAL TURN, of a DISEASE.

THE Criſis of a Diſeaſe is no other than the ſtruggle betwixt nature and the infirmity, which of them ſhall prevail. If nature at the time of the criſis overcomes the malignity of the diſeaſe, it is a ſure ſign it will be cured; but, if the ſickneſs prevails, it is then a pernicious criſis, and ſhows ſudden alterations for the worſe. Every ſudden and vehement motion of the diſeaſe may be called a criſis; therefore days critical, decretory, and criſmal, are all one and the ſame thing, and import no more than a certain and more ſure judgment of the infirmity afflicting, either more powerful, or leſs vehement, at thoſe times when the true criſis happens; therefore a criſis is to be calculated from that moment of time when the diſeaſe firſt invaded the patient. And on this ground I ſhall make ſome obſervations to prove the truth of what I have now to deliver, and of what I have before ſo often proved, that I cannot but admire the wonderful providence of God, who diſpoſeth all things by number, weight, and meaſure, preſcribeth to the whole ſyſtem of nature ſo immutable a law, that it were as eaſy for the heaven and the earth to return to their original chaos, as to break and infringe that immutable law, unleſs the divine will and pleaſure alter it miraculouſly.

We diſcriminate two ſorts of diſeaſes; acute, and chronic. Of acute diſeaſes ſome are ſimply acute, others peracute, that is very acute; others again are perperacute, or exceedingly acute. Thoſe that are ſimply acute are finiſhed in eight, ten, eleven, fourteen, twenty, or twenty-one, days. They are terminated in the time the Moon traceth the twelve celeſtial ſigns of the zodiac, viz. in twenty-ſeven days and eight hours.

Thoſe acute diſeaſes which ſuffer changes are very fickle; for ſometimes they increaſe, and ſometimes they are remitted, according as the Moon meets with the beams of either benefic or baneful planets; and ſometimes they change out of acute diſeaſes into chronic; and thus a continued fever may change into an hectic fever, or an intermittant fever into a continual fever; and theſe diſeaſes terminate in forty days.

Very acute diſeaſes are ſuch as terminate in five, ſix, ſeven, or eight, days; amongſt which is the diſeaſe called peripneumonia, or inflammation of the lungs. Exceedingly acute diſeaſes are ſuch as end in three or four days at fartheſt, as peſtilences, apoplexies, &c.

Chronic diſeaſes follow the motion of the Sun, and it is about ninety days before the firſt criſis begins to appear; for in that time the Sun comes to the proper quartile of the place he was in at the decumbiture; as appears in hectic fevers, dropſies, and the like. But, when he comes to thoſe degrees from the decumbiture which

are

are called indicative, or intercidental, which are both one, or judicial, (as may be ſeen in the Table,) ſome alteration will appear, whereby a man may judge of the criſis to come. For the patient will be well, if the Sun be well configurated with benign planets; but worſe, if in aſpect with evil ones; and this rule is infallible, if you conſider it from the nativity throughout the whole courſe of a man's life; for *diſeaſes are the particular attendants of the inequality of the elements in every human being.*

Alſo a criſis may be perfect, or imperfect. A perfect criſis is when the diſeaſe appears plain, and perfectly to be judged of; and this is ſometimes hopeful, and ſometimes deſperate. Hopeful, when there is a great probability of health and recovery; deſperate, when there are palpable ſigns of death. An imperfect criſis is when the diſeaſe is changed upon every light occaſion; as if Mars be the author of the diſeaſe, and in a double-bodied ſign; in this caſe the diſeaſe will be variable.

That criſis may be deemed ſafe, which comes without pernicious aſpects; but that is doubtful and dangerous which comes with malignant aſpects; what theſe aſpects are, with the ſignificators of every diſeaſe, and the mode of aſcertaining them, are already explained in my ILLUSTRATION of ASTROLOGY. I have there ſhown, that to judge of a diſeaſe, it is neceſſary to obſerve the motion of the Sun, Moon, and lord of the aſcendant. With reſpect to the lord of the aſcendant, obſerve, before you give judgment, what application he makes to any planet, either by conjunction, quartile, or oppoſition; or, ſhould he apply to more than one planet, look to which of them he approaches neareſt, and then count how many degrees of longitude are between them; and, if the diſeaſe be acute, then for every degree add a day; but, if chronic, a week, month, or year, according to the ſituation of Jupiter, Venus, Mercury, or the Moon, at a perfect criſis.

Now the time called critical is always evil, becauſe of the contrariety of the ſign the Moon is then in to the ſign ſhe was in at the decumbiture, which induceth the contrariety of her nature to the oppoſite place; therefore at ſuch a time there ariſeth a controverſy and conteſt between the diſeaſe and nature. The Moon upholds nature in acute diſeaſes; and hence is the reaſon that a bad criſis will always happen, if ſhe be afflicted upon a critical day by the bodies or evil beams of Saturn or Mars, or by the lord of the eighth houſe, or by the lord of the fourth houſe, if he be a malevolent, becauſe he ſignifies the grave. But, if the Moon at the time of the criſis behold the lord of the aſcendant, or be configurated with the benefic planets, health enſues, and the malady will be vanquiſhed and overcome in the conflict.

If the diſeaſe terminates not upon the firſt criſis, obſerve how the Moon will be configurated on the ſecond criſis, and judge by the ſame rules. If it terminates not then, as will ſometimes happen, view the third criſis, and judge by that the ſame

way. If your judgment, ſupported by reaſon and the former rules, declare that the diſeaſe will not terminate one way or other, neither in health nor death; then examine the face of the heavens at the time the Moon returns to the place ſhe was in at the decumbiture, which is at the end of twenty-ſeven days, eight hours, and ſome minutes; and judge according as the Moon ſhall be then configurated with benefic or malignant planets; for this of neceſſity terminates all acute diſeaſes; though we may obſerve that not one in a hundred holds on ſo long, nor one out of twenty continues half ſo long.

If the acute diſeaſe ends not in a month, it is then turned into a chronic diſeaſe; and muſt be judged of by the Sun. The rules for judging chronic diſeaſes by the Sun are ſimilar to thoſe by which we judge of acute diſeaſes by the Moon. Now, for the right diſtinction and calculation of time to judge of the progreſs of a diſeaſe in this way, obſerve the following method: See what degree the Moon was in at the decumbiture, by an Ephemeris, and add twenty-two degrees thirty minutes, which is called the indicative time, becauſe it informs the phyſician the nature of the diſeaſe; for upon theſe indicative days the diſeaſe is uſually remitted and mitigated. To this indicative time add twenty-two degrees thirty minutes more, and this points out the judicial day, viz. juſt forty-five degrees from the place of the Moon when the patient fell ſick, being the half of a criſis, and manifeſts, according as the Moon happens to be aſpected, whether a good or a bad criſis will enſue. To the judicial day add twenty-two degrees thirty minutes more, and it makes ſixty-ſeven degrees thirty minutes, which produces the ſecond indicative day, as falling between the criſis and judicial day. From this the phyſician may expect indications how the diſeaſe will finally ſhow itſelf. To this add twenty-two degrees thirty minutes more, and you have the perfect criſis of the diſeaſe from the decumbiture, viz. ninety degrees, or one quarter of the zodiac. At this time nature will manifeſt, according to the planets that are in aſpect to the Moon, whether the ſick perſon will have a good or bad criſis; and, adding twenty-two degrees thirty minutes more, it makes the next judicial day, when the Moon approacheth to it; and ſoon, through the whole twelve ſigns of the zodiac, and over it again, if the diſeaſe terminate not in that time, as will plainly appear by the following Table, which ſhows when the Moon comes to an indicative or to a judicial day, that is, a ſemiquartile, or half a criſis; and when to a true quartile, and when to an oppoſition, which is called a full criſis; and ſo to all the indicative and judicial days during the ſickneſs, &c.

EXAMPLE.

Suppoſe the true place of the Moon, at the time a perſon falls ſick, be ſixteen degrees of Gemini, which will be found in the fourth column of the following Ta-

ble, ſo that ſixteen degrees of Gemini will be the Moon's radical place in the decumbiture. Over againſt 16 degrees, to the right hand, I find 8 30, and over the head thereof I find ♋; ſo that, when the Moon came to eight degrees thirty minutes of Cancer, it was the firſt indicative day, wherein the phyſician might expect to ſee how the diſeaſe would ſhow itſelf. Upon every criſis or indicative day, make ſpecial obſervation what planet the Moon is in configuration with; if with a benevolent planet, expect ſome remiſſneſs in the diſeaſe; but, if with a malevolent, the contrary effect will follow. Next, on the right hand to 8 30 of ♋, you will find 1 ♌, which ſhows that, when the Moon comes to the firſt degree of Leo, ſhe will be in ſemiquartile to her firſt place; and this is, as before ſtated, half a criſis, at which time the diſeaſe will more or leſs manifeſt itſelf according to ſuch configurations as the Moon is found to make with the other planets at the time ſhe comes to the firſt degree of Leo. In the next column on the right hand, you ſee 23 30, and over it ♌. This points out the indicative day, wherein the phyſician is enabled further to judge of the increaſe or decreaſe of the diſeaſe. In the next column you find 16, and over it ♍, which indicates that, when the Moon came to the ſixteenth degree of Virgo, there was a true criſis, whereby the diſeaſe might be more fully inveſtigated, and a judgment framed according to the aſpects the Moon in that degree had to the good or evil planets; for from hence will the patient or phyſician deſcry a better or worſe criſis, in progreſſive order. And thus, in the continued line or column, you may run round the face of the Heavens, obſerving the configurations of the Moon when ſhe comes to thoſe places of the zodiac wherein ſhe makes the indicative, judicial, and critical, days, and what planet or planets ſhe is then in contact with, and whether in the decumbiture they promiſe good or evil. Beſides this, you muſt obſerve on what day the Moon, or the lord of the aſcendant, tranſits the cuſp of the ſixth, ſeventh, and eighth, houſes, and how ſhe is then aſpected with the benevolent or malign planets; and obſerve whether ſhe be combuſt, or in *via combuſta*, which is from the twentieth degree of Gemini to the firſt of Cancer, in the northern part of the zodiac, and in the ſouthern from the ſixth degree of Sagittarius to the ſixteenth of the ſame conſtellation; and from the twenty-fourth degree of Sagittarius to the fifth degree of Capricorn, or in conjunction, quartile, or oppoſition, of Saturn, or Mars, or of a combuſt planet, or of ſome fixed ſtar of a malignant nature; for in all theſe caſes an indication is given of death, or of long and ſevere ſickneſs, according to the number of teſtimonies and aſtral indications, as expreſſed in the rules given in my ILLUSTRATION OF ASTROLOGY; but in which the following moſt valuable Table was omitted.

A LU-

A LUNAR TABLE,

Which, by entering with the Degree of the Moon at the Time any Person falls sick, will point out at one View the Indicative, Judicial, and Critical, Day, of the Disease.

♈	♈	♉	♊	♋	♋	♌	♍	♎	♎	♏	♐	♑	♑	♒	♓
0 30	23	15 30	8	0 30	23	15 30	8	0 30	23	15 30	8	0 30	23	15 30	8
1 30	24	16 30	9	1 30	24	16 30	9	1 30	24	16 30	9	1 30	24	16 30	9
2 30	25	17 30	10	2 30	25	17 30	10	2 30	25	17 30	10	2 30	25	17 30	10
3 30	26	18 30	11	3 30	26	18 30	11	3 30	26	18 30	11	3 30	26	18 30	11
4 30	27	19 30	12	4 30	27	19 30	12	4 30	27	19 30	12	4 30	27	19 30	12
5 30	28	20 30	13	5 30	28	20 30	13	5 30	28	20 30	13	5 30	28	20 30	13
6 30	29	21 30	14	6 30	29	21 30	14	6 30	29	21 30	14	6 30	29	21 30	14
7 30	30	22 30	15	7 30	30	22 30	15	7 30	30	22 30	15	7 30	30	22 30	15
	♉				♌				♍				♒		
8 30	1	23 30	16	8 30	1	23 30	16	8 30	1	23 30	16	8 30	1	23 30	16
9 30	2	24 30	17	9 30	2	24 30	17	9 30	2	24 30	17	9 30	2	24 30	17
10 30	3	25 30	18	10 30	3	25 30	18	10 30	3	25 30	18	10 30	3	25 30	18
11 30	4	26 30	19	11 30	4	26 30	19	11 30	4	26 30	19	11 30	4	26 30	19
12 30	5	27 30	20	12 30	5	27 30	20	12 30	5	27 30	20	12 30	5	27 30	20
13 30	6	28 30	21	13 30	6	28 30	21	13 30	6	28 30	21	13 30	6	28 30	21
14 30	7	29 30	22	14 30	7	29 30	22	14 30	7	29 30	22	14 30	7	29 30	22
		♊				♍				♐				♓	
15 30	8	1 30	23	15 30	8	0 30	23	15 30	8	0 30	23	15 30	8	0 30	23
16 30	9	2 30	24	16 30	9	1 30	24	16 30	9	1 30	24	16 30	9	1 30	24
17 30	10	3 30	25	17 30	10	2 30	25	17 30	10	2 30	25	17 30	10	2 30	25
18 30	11	4 30	26	18 30	11	3 30	26	18 30	11	3 30	26	18 30	11	3 30	26
19 30	12	5 30	27	19 30	12	4 30	27	19 30	12	4 30	27	19 30	12	4 30	27
20 30	13	6 30	28	20 30	13	5 30	28	20 30	13	5 30	28	20 30	13	5 30	28
21 30	14	7 30	29	21 30	14	6 30	29	21 30	14	6 30	29	21 30	14	6 30	29
22 30	15	8 30	30	22 30	15	7 30	30	22 30	15	7 30	30	22 30	15	7 30	30
			♋				♎				♑				♈
23 30	16	9 30	1	23 30	16	8 30	1	23 30	16	8 30	1	23 30	16	8 30	1
24 30	17	10 30	2	24 30	17	9 30	2	24 30	17	9 30	2	24 30	17	9 30	2
25 30	18	11 30	3	25 30	18	10 30	3	25 30	18	10 30	3	25 30	18	10 30	3
26 30	19	12 30	4	26 30	19	11 30	4	26 30	19	11 30	4	26 30	19	11 30	4
27 30	20	13 30	5	27 30	20	12 30	5	27 30	20	12 30	5	27 30	20	12 30	5
28 30	21	14 30	6	28 30	21	13 30	6	28 30	21	13 30	6	28 30	21	13 30	6
29 30	22	15 30	7	29 30	22	14 30	7	29 30	22	14 30	7	29 30	22	14 30	7

With

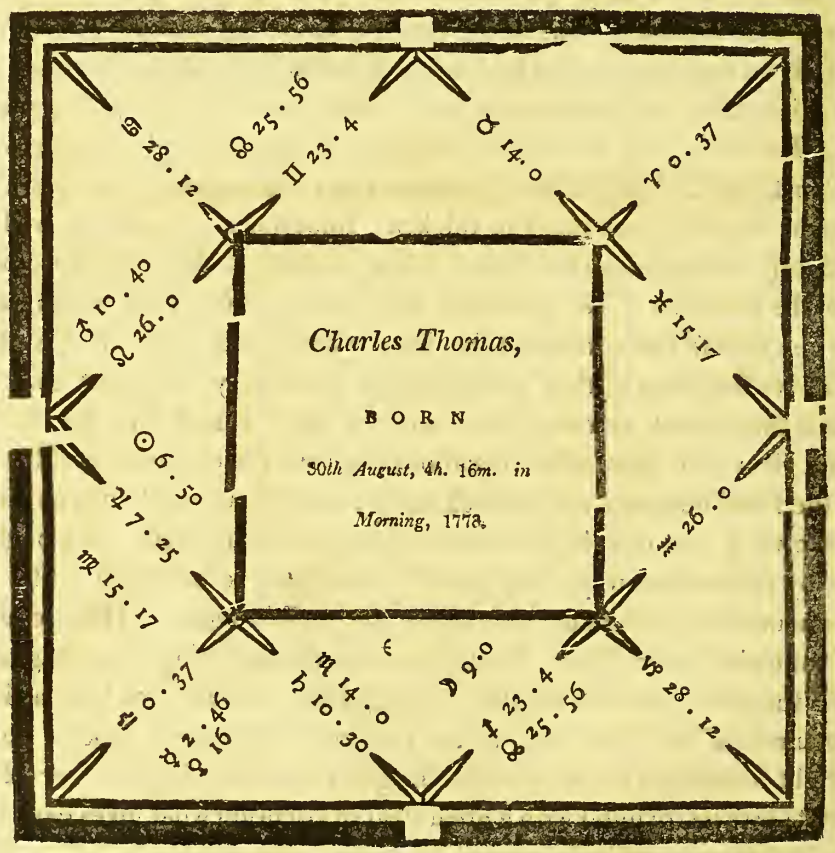
With reſpect to moderate or ſlight diſeaſes, Hippocrates aſſerted, in the firſt place, "That contraries, or oppoſites, are the remedies for each other;" and this maxim he explains by an aphoriſm; in which he ſays, that evacuations cure thoſe diſtempers which come from repletion, and repletion thoſe that are cauſed by evacuation. So heat is deſtroyed by cold, and cold by heat, &c. In the ſecond place, he aſſerted, that "phyſic is an addition of what is wanting, and a ſubtraction or retrenchment of what is ſuperfluous:" an axiom which is explained by this, viz. that there are ſome juices or humours, which in particular caſes ought to be evacuated, or driven out of the body, or dried up; and ſome others which ought to be reſtored to the body, or cauſed to be produced there again. As to the method to be taken for this addition or retrenchment, he gives this general caution, That you ought to be careful how you fill up, or evacuate, all at once, or too quickly, or too much; and that it is equally dangerous to heat or cool again on a ſudden; or rather, you ought not to do it: every thing that runs to an exceſs being an enemy to nature. In the fourth place, Hippocrates allowed that we ought ſometimes to dilate, and ſometimes to lock up: to dilate, or open the paſſages by which the humours are voided naturally, when they are not ſufficiently opened, or when they are cloſed; and, on the contrary, to lock up or ſtraiten the paſſages that are relaxed, when the juices that paſs there ought not to paſs, or when they paſs in too great quantity. He adds, that we ought ſometimes to ſmooth, and ſometimes to make rough; ſometimes to harden, and ſometimes to ſoften again; ſometimes to make more fine or ſupple; ſometimes to thicken; ſometimes to rouſe up, and at other times to ſtupify or take away the ſenſe; all in relation to the ſolid parts of the body, or to the humours. He gives alſo this farther leſſon, That we ought to have regard to the courſe the humours take, from whence they come, and whither they go; and in conſequence of that, when they go where they ought not, that we make them take a turn about, or carry them another way, almoſt like the turning the courſe of a river; or, upon other occaſions, that we endeavour if poſſible to recal, or make the ſame humours return back again; drawing upward ſuch as have a tendency downward, and drawing downward ſuch as tend upward. We ought alſo to carry off, by convenient ways, that which is neceſſary to be carried off; and not let the humours once evacuated enter into the veſſels again. Hippocrates gives alſo the following inſtruction; That, when we do any thing according to reaſon, though the ſucceſs be not anſwerable, we ought not too eaſily, or too haſtily, to alter the manner of acting, as long as the reaſons for it are yet good. But, as this maxim might ſometimes prove deceitful, he gives the following as a corrector to it: "We ought (ſays he) to mind with a great deal of attention what gives eaſe, and what creates pain; what is eaſily ſupported, and what cannot be endured." We ought

not to do any thing raſhly; but ought often to pauſe, or wait, without doing any thing: by this way, if you do the patient no good, you will at leaſt do him no hurt.

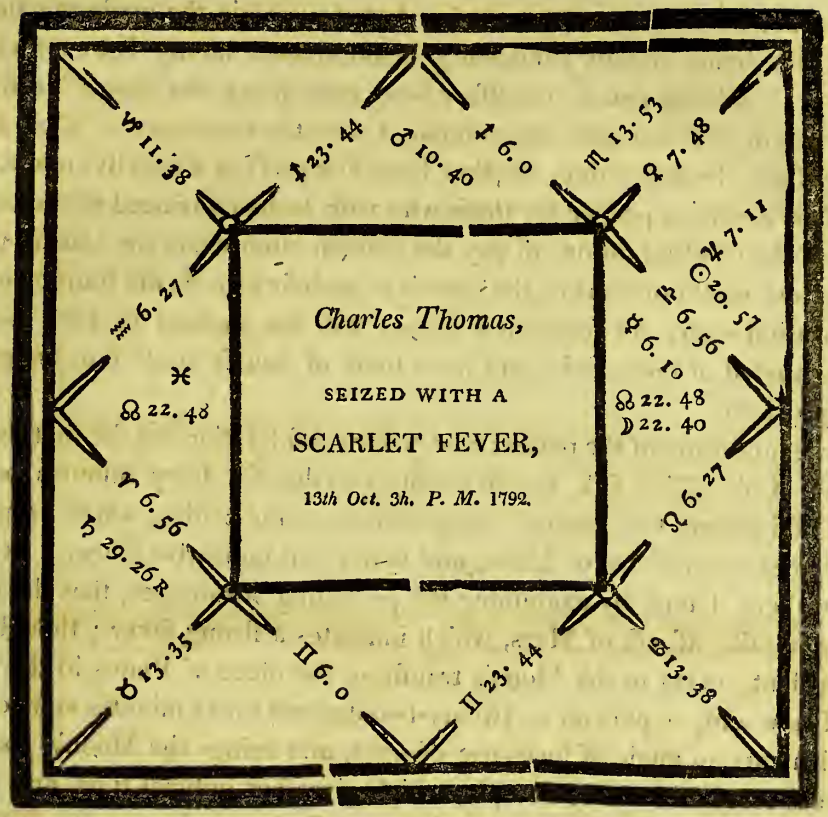
Theſe are the principal and moſt general maxims of the practice of Hippocrates, and which proceed upon the ſuppoſition, that nature cures all ſlight diſeaſes. When, however, they are acute or ſevere, they demand the utmoſt ingenuity and ſkill of the phyſician to moderate their violence; and it is then that their termination may be known by conſulting the foregoing Table.

Of the UTILITY of the preceding TABLE.

IN order to ſhow the great utility and convenience of this Lunar Table, in deciding the event of any particular fit of illneſs, I ſhall here ſtate ſome real predictions which were made, during the indiſpoſition of ſome of my patients, and for whom the following horoſcopes were erected.



Charles



I have placed the horoſcope of this patient's nativity before the figure of his decumbiture; in order to ſhow, by way of analogy, that ſuch an indiſpoſition would certainly take place about this time, from the poſition of the ſignificators, and their particular configurations with the heavenly intelligencers, at the time of his birth. For this reaſon, the figure of the ſick perſon's nativity ſhould always be inſpected where it can be had, becauſe it enables us the better to judge, in many intricate caſes, whether the diſeaſe will terminate with life or death; for although, in moſt common maladies, it is poſſible to determine this queſtion pretty accurately, by the help of the preceding Table, without the radical figure of birth, yet, where that can be had, our judgment will in general be more certain, and often infallible.

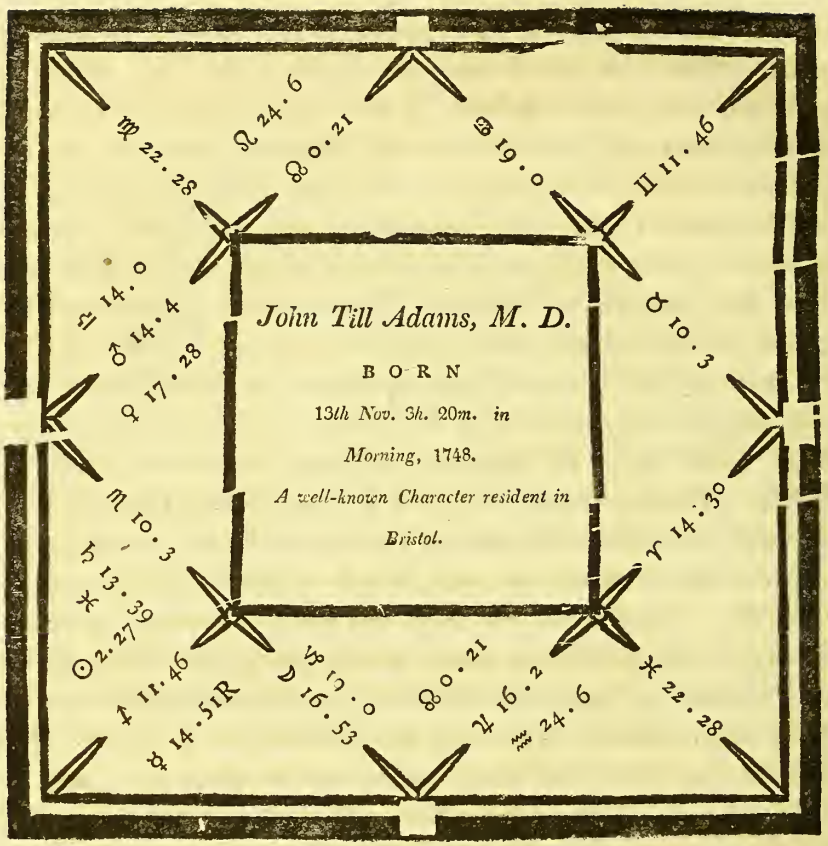
In the above figure of the decumbiture of the patient, we find the Moon hath lately tranſited the place of the Sun and Jupiter in the figure of birth; and that this place is in the fiery triplicity, afflicting the Moon in the radical point with a quartile aſpect; at the ſame time that the Moon and Mars beholding each other with a trine, from fiery ſigns, at the time of birth, clearly ſhows that the native would be ſubject to fevers of the inflammatory kind. But I ſhall decline making any comments on the temperature of the native, or the deſignation of his ſignificators at the time

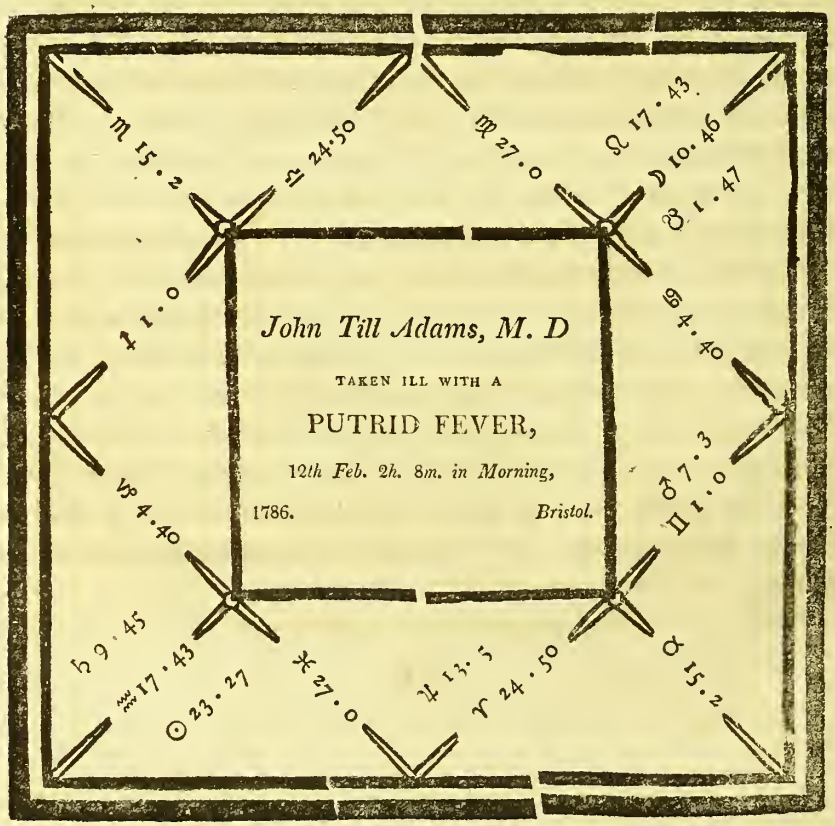
time of birth; as it is not my intention here to explain the mode of calculating a nativity, that being already ſufficiently demonſtrated in my ILLUSTRATION of ASTROLOGY. All that can be neceſſary here, is to give a few examples from the decumbitures of different patients, compared with the horoſcope of their nativity, in order to ſhow, by the Table, whether ſuch ſick perſons would live or die. And, in doing this, it will be proper for thoſe who wiſh to be convinced of the truth and exiſtence of the celeſtial influx, to pay the ſtricteſt attention to the Moon's places in the Table, and what poſitions of the benefic or malefic aſpects ſhe tranſits, or comes in configuration with; for from theſe events will the malady of each particular patient be abated or increaſed; and from theſe of courſe muſt our judgment be ultimately drawn.

By the decumbiture of the patient now under conſideration, we ſee that the Moon, at the time of his falling ſick, was in twenty-two degrees forty minutes of Virgo. To this I add twenty-two degrees thirty minutes of the zodiac, which brings her to fifteen degrees ten minutes of Libra, and is her firſt indicative place. At the time ſhe arrives here, I find, by examining the preceding horoſcopes, that ſhe is within orbs of a ſextile aſpect of Mars, which indicates a ſtrong fever; though not extremely ardent, owing to the Moon's tranſiting the place of Venus in the figure of birth. I now add, or paſs on to, twenty-two degrees thirty minutes more of the zodiac, which cuts an angle of forty-five degrees, and brings the Moon's place to ſeven degrees forty minutes of Scorpio, which gives her judicial time, and furniſhes the means of directing our judgment whether a ſevere or favourable criſis would follow. To this end I inſpect the figures, and find that the Moon now comes to a conjunction of the two benevolent planets Jupiter and Venus, which alone prognoſticates a favourable criſis; and the more ſo, as at this time the Moon nearly tranſits the place of Saturn in the horoſcope of birth: accordingly, the patient became much better, the fever decreaſed, and his pulſe was more regular. From the Moon's judicial place in Scorpio, I now paſs on twenty-two degrees thirty minutes further, which ſhows her ſecond indicative poſition, in ten minutes of Sagittarius; where, finding no particular aſpect of the principal ſtars or luminaries, it portended little or no alteration in the ſtate of the diſeaſe at this time; and ſo it happened. I now advance twenty-two degrees thirty minutes more, which ſhows the place of the Moon on that day to be in twenty-two degrees forty minutes of Sagittarius, where ſhe produced the firſt criſis of the diſorder. It was now obſervable, that from the laſt indicative day to the time of this criſis, the patient ſhowed ſigns of a delirium, and rambled much in his talk, concerning riding of horſes; which exactly correſponds with the nature of the ſign where the criſis fell; but it was evident he would recover from this, and be much mended, when the Moon formed her trine with

Saturn,

Saturn, to which ſhe was approaching, in twenty-nine degrees twenty-ſix minutes of Sagittarius. When this aſpect was formed, the patient had viſibly recovered, and the brain was never after affected. I now proceed twenty-two degrees thirty minutes more on the zodiac, which brings the Moon to her next indicative day, in fifteen degrees ten minutes of Capricorn. Here the two celeſtial luminaries form a quartile, a diſcordant aſpect, which gave the patient a relapſe. Proceeding the next twenty-two degrees thirty minutes, I come to the Moon's judicial place, in ſeven degrees forty minutes of Aquaries. Here we find a mundane trine, formed by Jupiter and Venus with the Moon, and a zodiacal trine of Mercury, a plain demonſtration that the diſorder muſt abate, and that a favourable criſis would enſue. To the ſeven degrees forty minutes of Aquaries, I add twenty-two degrees thirty minutes more, which brings the Moon to her ſecond indicative place, in ten minutes of Piſces. Viewing the decumbiture, I now find the Moon approaches to a trine aſpect under the benign influence of Jupiter and Venus, which overcomes the quartile of Mars, and indicates that the diſeaſe would be completely conquered by the next criſis. To aſcertain the truth and manner of this, I proceed onwards twenty-two degrees thirty minutes more, which brings the Moon to twenty-two degrees forty minutes of Aquaries, where the ſecond grand criſis was to be produced. Now upon maturely inſpecting the decumbiture, I find the Moon, at the time this patient was ſeized with his diſorder, was placed in her north node, and contributed to the evil effects of the other configurations; but at the time of this grand criſis, ſhe is fortunately poſited in her ſouth node, thereby helping to depreſs the vitiated humours of the body, and to overcome the diſeaſe. This poſition, contributing to the favourable influence of the other configurations, reſtored the patient from his bed of ſickneſs, and his ſtrength gradually increaſed; ſo that by the time the Moon formed her conjunction with Saturn, as expreſſed on the face of the heavens in the figure of his decumbiture, the maſs of blood was purified from all feveriſh ſymptoms, and the patient was reſtored to his accuſtomed health and ſtrength. And thus we may ſee, that by erecting the decumbiture, or figure of the poſitions of the heavenly bodies, at the time any patient is ſeized, and proceeding in this manner to aſcertain the influence of the good or evil aſpects on the indicative, judicial, and critical, days, we ſhall, without difficulty, be able to determine whether the diſeaſe will prove ſlight or dangerous, and be directed accordingly in our regimen and mode of treatment. But in order to make this ſpeculation ſtill more obvious to the young practitioner, as well as to the curious reader, I ſhall now proceed to examine the decumbiture of a patient, whoſe diſeaſe was more malignant, and proved fatal.


John Till Adams, M. D.
BORN
13th Nov. 3h. 20m. in
Morning, 1748.
A well-known Character resident in
Bristol.


John Till Adams, M. D
TAKEN ILL WITH A
PUTRID FEVER,
12th Feb. 2h. 8m. in Morning,
1786.
Bristol.

Theſe figures I erected while reſident in Briſtol, at the requeſt of my good friend Dr. Till Adams, who being ſeized with a malignant fever, accompanied with dangerous ſymptoms, and being himſelf a friend to, and an admirer of, the Occult Sciences, was deſirous of ſeeing the reſult of ſuch an enquiry, and of judging himſelf, by theſe means, whether he ſhould live or die.

In conſidering the ſidereal effect of the preceding figures, it is by no means requiſite to calculate the genethliacal prognoſtications of the ſeven erratics at the time of the native's birth. It is however neceſſary to notice their principal aſpects and poſitions in the horoſcope, in order to determine whether the ſame poſitions are tranſmitted, or ſimilar or adverſe aſpects formed in the decumbiture, at the time the patient is taken ill; but no further or more minute ſpeculation is required, ſince we are neither conſidering the effect of directions, nor the fate of a nativity; but are endeavouring to prove, that, by only obſerving the poſition of the heavens at the time the patient is taken ill, the probable termination of the diſeaſe might be foretold, and whether it would end in life or death. Firſt, then, we may obſerve, the Moon is ſituated in the eighth houſe, termed by the ancients the houſe of death, becauſe of its obſcurity and poſition under the earth. Beſides this, we find the Moon in oppoſition to Saturn, who was her diſpoſitor at the time of birth; and from this aſpect ſhe forms an oppoſition with Venus, the lady of the doctor's aſcendant; and immediately approaches to an oppoſition of the Sun, the fountain of life. Theſe are three evil directions by poſition, and furniſh a very unfavourable proſpect of the event of the diſeaſe. For the Moon, the giver of radical moiſture, afflicted by the adverſe rays of the Sun, the author of vital heat, fails not to produce ſuch a putrifaction of the animal juices, as to bring on a ſpeedy diſſolution of the body. Let us then examine the decumbiture by our Table, and ſee how and when this fatal event would take place.

At the time the patient fell ſick, we find the Moon in ten degrees forty-ſix minutes of Leo; to which add twenty-two degrees thirty minutes for the firſt indicative time, which falls in three degrees ſixteen minutes of Virgo; and indicates the nature of the diſeaſe to be a fever; for the Moon, from this indicative place, beholds the Sun in the radical point with a baneful quartile aſpect; and the Moon, according to her own nature, was Saturnine, as departing from a ſextile configuration with Saturn in the radix, to a quartile with Venus, lady of the aſcendant, and giver of life; and therefore, according to the aſtral rules of the immortal Ptolomy, this firſt motion of the Moon from the radical point of the decumbiture indicated evil. I now go forward twenty-two degrees thirty minutes more, for the firſt judicial day, which places the Moon in twenty-five degrees forty-ſix minutes of Virgo. Now as the Moon is not configurated at this judicial time with either of the planets, neither

neither by tranſit in the nativity, nor aſpect in the decumbiture; and her judicial place falling in the twelfth houſe, the houſe of affliction; we cannot draw any favourable judgment from theſe circumſtances; but, on the contrary, a dangerous criſis is to be expected. To this judicial time, we add twenty-two degrees thirty minutes more, and it brings the Moon ſixty-ſeven degrees from the place ſhe occupied when the patient was ſeized with the diſorder; and this is her ſecond indicative place, which falls in eighteen degrees ſixteen minutes of Libra. Now, if we inſpect the foregoing horoſcopes, we ſhall find the Moon, in approaching to this point, has juſt departed from a baneful oppoſition with Jupiter, which, having the direct oppoſite effect of a conjunction with that benevolent planet, which repreſents the heart and vital principle, ſhows a contaminated or morbid ſtate of the blood and lymph. We likewiſe perceive the Moon is in quartile to her own radical place, tranſiting at the ſame time the body of Venus, and making this aſpect the harbinger of a fatally-approaching criſis. To determine this fact, I proceed twenty-two degrees thirty minutes further in the zodiac, which brings the Moon to ten degrees forty-ſix minutes of the ſign Scorpio, at which point of time the criſis, or critical day, of this patient's diſeaſe occurred. Now by inſpecting the figures, we ſhall perceive this criſis is uſhered in by ſuch evil configurations of the heavenly bodies, the ſecond cauſes under nature, as would not only heighten the malady, and put it out of the power of medicine to ſubdue, but would infallibly terminate in death. In the firſt place we ſhall notice, that the Moon tranſits the place of Saturn in the radical point; ſecondly, ſhe is configurated in a malefic quartile aſpect of Saturn in the decumbiture; thirdly, ſhe is within orbs of a baneful quartile of Venus, lady of the patient's aſcendant; and fourthly, ſhe is rapidly approaching to a quartile configuration of the Sun, which is inimical to life and motion, without any one friendly aſpect of the benefic planet Jupiter intervening, to leſſen or repel the malefic influence. Such, therefore, are the teſtimonies, that under any kind of malady and wherever they occur, infallibly portend the death of the patient; and they accordingly put an end to the exiſtence of this much-reſpected man, whoſe integrity in his profeſſion had gained him univerſal eſteem, and renewed in him the ineſtimable character of the immortal Culpeper, who, never, with a view to gain, gave two medicines for the cure of an afflicted fellow-creature, when one was ſufficient. But death levels all diſtinctions; and, in ſtrict conformity with the time and manner pointed out by the above decumbiture, it conducted the ſoul of this excellent man from an earthly to an heavenly habitation, on the 20th of February, 1786, at the time the Moon formed her quartile aſpect with the Sun, which was in eight days from the time he was ſeized with the fever, and ſix days after it was foretold by the preceding horoſcopes; from whence, having foreſeen the doctor's fate, I compoſed

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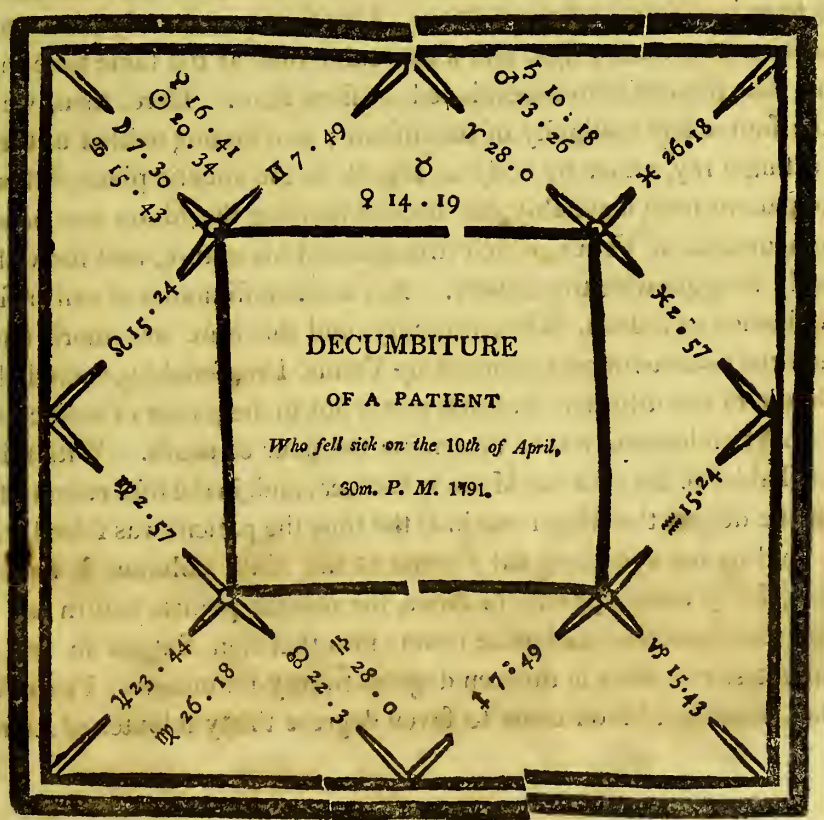
an Elegy on his death, while he was yet alive, which I got printed, and publiſhed on the very day he expired; thus manifeſting to the world, with the patient's earneſt approbation, an incontrovertible inſtance of the verity of aſtral prediction.

Having thus far endeavoured to prove the utility of the Lunar Table, by the indiſpoſition and recovery of Charles Thomas, a pupil of Mr. Hall, engraver to his majeſty, in the one caſe; and by the ſickneſs and death of Dr. Till Adams, in the other; I ſhall now, for the farther ſatisfaction of the reader, prove, that it is poſſible to judge whether a patient will live or die, from the horoſcope of the decumbiture only, without knowing or recurring to the horoſcope of the patient's nativity, or time of birth.—To this end, the following axiom muſt ever be remembered: That if we find, at the time any perſon is ſeized with illneſs, that the Moon is afflicted by more than one planet; and that on the next critical day ſhe forms a congreſs with the malefic planets Saturn and Mars, either by conjunction, quartile, or oppoſition, the ſick perſon ſhall die on the day and hour in which the afflicted Moon comes to the interficient point of the zodiac; as the great Ptolomy declareth in his 16th Aphoriſm: "We muſt behold the motion of the Moon as ſhe paſſeth through the critical, judicial, and mortal, days; for, if ſhe be in them fortunate, it fareth well with the patient; but, if unfortunate, the contrary." I ſhall exemplify this b the following example.

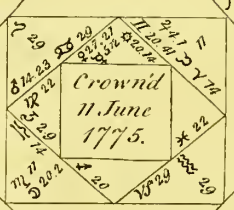


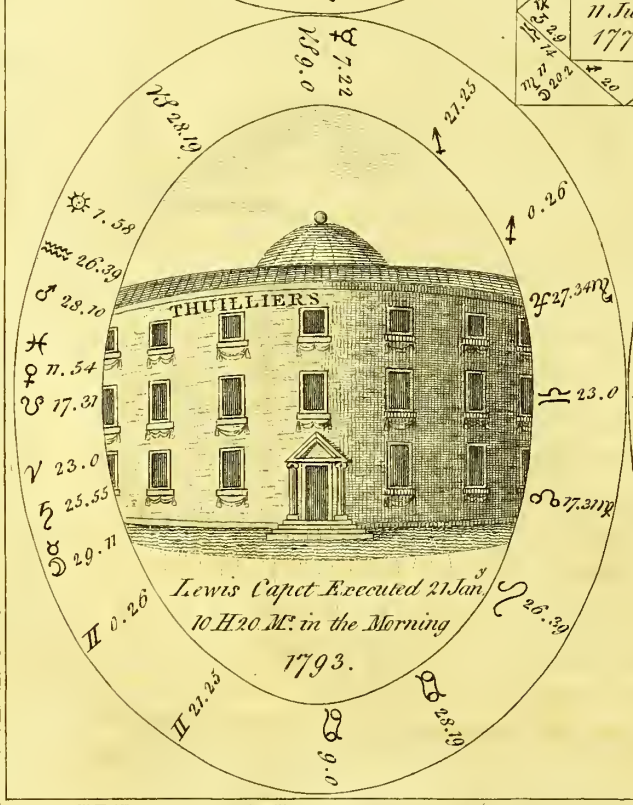
Being ſent for to a perſon who fell ſick on the 10th of April, 1791, and being deſirous to know the event of his diſeaſe, I examined the face of the heavens at the exact time the patient was ſeized, viz. at half paſt twelve o'clock at noon, when the celeſtial intelligencers were poſited as in the above decumbiture, and which are as follow: The Moon, which in all decumbitures repreſents the ſick perſon, is ſituated within the quartile influence of no leſs than four planets, Saturn, Mars, Mercury, and the Sun; and, as they are all within orbs of a conjunction with each other, it follows that the diſeaſe would bear deſignation of their joint pernicious influx, which, ſcientifically conſidered, manifeſts a fever, with putrefaction of the animal juices, as thoſe ſkilled in the aſtral ſcience will quickly ſee. For the Sun's burning influence, in conjunction with Mars, a hot and violent planet, and Mercury being controvertible in his nature, unites in the malefic rays of the Sun and Mars; and, although Saturn is conſtitutionally cold, yet, being alſo dry, his cold quality is over-balanced, inaſmuch as drought participates of the qualities of heat, being fuel for the fire. Yet the cold quality of Saturn ſpecificates the diſeaſe, by ſhowing that it ſprung from a cold cauſe, or deathly chill, extended over the whole circulating ſyſtem, or maſs of blood.

On examining the patient, he informed me he had drunk a quart of cold water, being overcome with heat and thirſt, and in a violent perſpiration, whence his blood muſt have been in a highly-inflamed ſtate. This ſeems eminently prenoted by the Moon's poſition in a watery ſign, and a moveable one, at the ſame time in oppoſition to the four planets above-mentioned, in fiery ſigns. Here, then, we at once perceive the ſource and malignity of the diſeaſe; and finding neither of the benefic ſtars caſt a ſingle ray, either by body or aſpect, to the aphetic place, I thence concluded the patient muſt inevitably die, notwithſtanding the Moon was beheld by a ſextile configuration of Venus, which ſtrengthened his nature, and ſhowed that he would greatly ſtruggle with the malady. But as the teſtimonies of evil ariſing from the joint influence of Saturn, Mars, Mercury, and the Sun, are more and much greater than the contra-ſupport afforded by Venus, I reaſonably concluded the patient would die of the diſorder, and that it was not in the power of medicine to ſave him. My next endeavour was to determine the hour of death. With this view I look to the Table, p. 380, for the Moon in Cancer; and, in the fifth column from the left, I find the degree the Moon was in at the time the patient was ſeized, viz. 7 30; and then, guiding my eye along till I come to the ninth column, I find 7 30 of Libra; now, Libra being oppoſite to Aries, the malefic planets Saturn and Mars of courſe ſend their oppoſite malignant beams into that ſign, Saturn in ten degrees eighteen minutes, and Mars in thirteen degrees twenty-ſix minutes; I therefore concluded, that, when the Moon came to ſeven degrees thirty minutes of Libra in the zodiac,

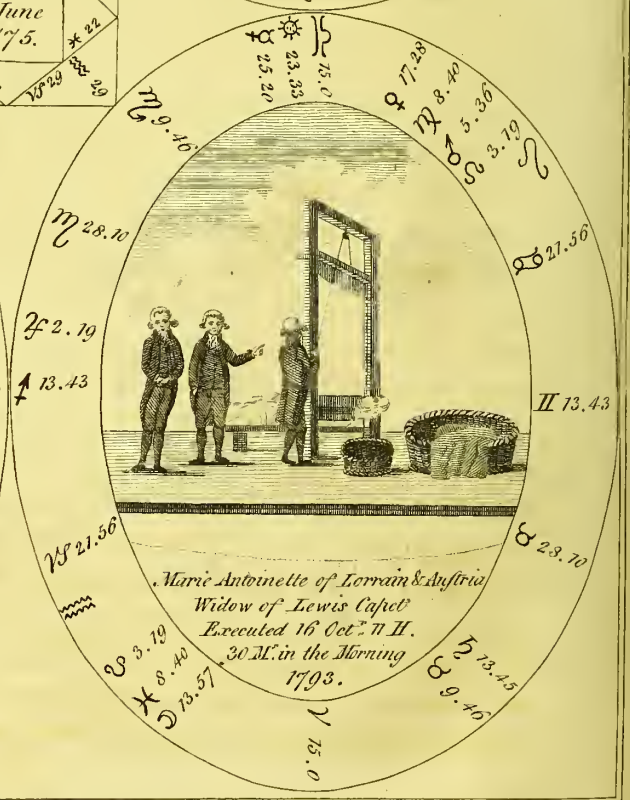
Lewis 16th King of France
Born 23 Aug.t 3 H 30 M.s
P.M.
1754.

Marie Antoinette Queen of France
Born 2 Nov.r 7 H 23 M.s
P.M.
1755.





Lewis Capet Executed 21 Jan.y
10 H 20 M.s in the Morning
1793.



Marie Antoinette of Lorrain & Austria
Widow of Lewis Capet
Executed 16 Oct.r 11 H.
30 M.s in the Morning
1793.

Dodd del. Post sculp.

Nativities of the late King & Queen of France.

zodiac, the criſis would take place, as may be ſeen at the top of the fifth column in the Table; and that when the Moon came to ten degrees eighteen minutes, being the oppoſition of Saturn, a viſible change in the patient would take place for the worſe; and that when ſhe arrived at the thirteenth degree twenty-ſix minutes of the ſame ſign, thereby forming the oppoſition with Mars, the diſeaſe would prove mortal, and terminate in death. If, therefore, the duration of the diſeaſe be reckoned by the motion of the Moon, we ſhall find, without any enquiry from the nurſe or doctor, that the patient died about half paſt four o'clock in the afternoon, on the 17th of April, 1791, at which preciſe time the critical aſpect on which the diſeaſe turned was formed. Thus was afforded an inconteſtible proof of the correctneſs of my Lunar Table, and of the force and power of the planetary influx on ſublunary bodies.

Of the DIFFERENCE betwixt a NATURAL and VIOLENT DEATH, exemplified by the FATE of the late KING and QUEEN of FRANCE.

WITH a view to teach the curious reader how to diſtinguiſh the aſtral teſtimonies portending a violent death from thoſe which foreſhow our natural diſſolution, I ſhall, by way of example, inveſtigate the particular configurations which prenoted the violent death of the late unfortunate Louis XVI. king of France, and his unhappy conſort, Marie-Antoinette of Auſtria. For this purpoſe I have annexed a copper-plate engraving of their nativities, with figures of the poſitions of the celeſtial intelligencers at their coronation, and on the days of their execution. Whoever has peruſed my Illustration of Astrology, will have ſeen, that in my predictions, publiſhed in the year 1786, I foretold the revolution in the French empire, and the dethronement and execution of the French king and queen, ſix years before it happened; with all the dreadful conſequences appertaining thereto, exactly as they have ſince fallen out; and whoever lives to ſee the upſhot of a few years, will alſo ſee every other part of my predictions literally fulfilled. I could even now publiſh to the world the ſucceſs and termination of many great events, which all men are anxious to know, though few perhaps would believe, were I at liberty to diſcloſe them. The ſafety of particular individuals, the well-being of the ſtate, the peace of ſociety, the proſperity of empires, hang upon the iſſue of a few revolving periods; and, though *wiſe* the age we live in, yet few would brook the admonitions of a friend, though they ſhould lead to a proſperity and riches—to glory and renown. The uncommon poſitions of the heavenly bodies, which are the ſecond cauſes in the ſecret operations of Nature, are at this time well worthy the attentive conſideration of the naturaliſt and ſpeculative philoſopher. Their mundane influence is by no means confined to the nations of Europe, but threatens

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the ruder and more widely-extended realms with the effect of a convulsive stroke. God, in his unbounded favour to the British isles, will overshadow and protect them: and it is not impossible but the day may come, when the humble author of these remarks may be at liberty to amplify and develope the subject in some future publication. In the mean time, let Prussia, and all the smaller German states, beware; for the time will soon come, that *Germany shall be no more.**

Louis XVI. was born the 23d of August, 3h. 50m. P. M. 1754. The sign Sagittarius ascended upon the eastern fineter of the horizon, intercepted by Capricorn; wherefore Jupiter and Saturn are the lords of his ascendant, and, with the Moon in the tenth house, represent his person. From the nature and quality of these significators, we may deduce the following inferences: That Saturn being in the ascendant gave the native a wavering and irresolute disposition; the Moon posited in Scorpio gave him a taste for luxury; and Jupiter, being co-significator in the eighth house, in aspect with Mercury, rendered him mild and passive, yet declared that his principal actions shall be attended with disappointment, and produce him much anxiety, vexation, and insult. In the royal hereditary figure of birth, we find four planets occupying the house of death; and as the Moon, giver of life, is disposed of by one of those planets, it is an argument that he would not live to an old age. The precise time of death is only ascertainable by bringing up the several directions of the nativity: and, as the method of doing this is already amply explained in my Illustration of Astrology, we must refer those who choose to work them up, for any assistance they may want, to the rules there laid down. Suffice it here, that we point out those testimonies from the face of the nativity, that are always found to be arguments of a violent death. These are, First, Saturn in the ascendant, posited in a violent sign. Secondly, the Moon, giver of life, configurated with the violent fixed star Chælæ. Thirdly, the lord of the ascendant malevolently conjoined with the lord of the house of death. Fourthly, the two lights of the world depressed in the eighth house. And, fifthly, the Moon elevated in the dignities of an infortune, and Mars, her dispositor, having his fall in a human sign, plainly demonstrate that the native should fall by the hand of man. And this was unhappily verified by his execution, on the 21st day of January, 1793, at twenty-two minutes past ten in the morning; at which time these malefic directions came up, as represented in the figure of his execution, in the preceding plate. At that fatal moment we find the Sun, the light of time, was in his detriment; that Mercury, the significator of

* I presume that the accomplishment of this bold prediction, which the author did not live to see, will be found in the formation of the Confederation of the Rhine, in the suppression of the small states and annihilation of the Germanic circles, and the erection of the kingdoms of Bavaria, Saxony, Wirtemberg, and Westphalia, instead of them; but particularly when Francis II. renounced the title of Emperor of Germany, Aug. 6, 1806. EDITOR.

the

the French people, occupied the cuſp of the tenth houſe, tranſiting the place of Saturn, the king's ſignificator, at the time of birth; and that the two malefic planets Saturn and Mars are in reception of each other; and that the Moon, the ſignificator of life, is ſurrounded with violent fixed ſtars, in oppoſition to the benign planet Jupiter, in angles, and in quartile to Mars, her diſpoſitor in the horoſcope of birth; all which peculiar configurations are ſo many ſtrong and irreſiſtible arguments of the reſolution of the people to proceed to extremities, and of the irrevocable fate of this unfortunate monarch. For, although Jupiter, his co-ſignificator, is obſerved to ſend a friendly ray to the aphetic place, yet having no dignities, and being diſpoſed of by Mars, the ſignificator of the convention, this benefic aſpect was depreſſed, and its influence overcome, by the redundancy of a malefic influx. This admirably points out the ſtruggles of Dumourier, in the hope of being able to preſerve the life of the king; but his endeavours were quickly borne down by the violence of the leading faction, and there was not a man to be found who had courage enough to ſecond his heroic intentions. This alſo, by the rules of the ſidereal ſcience, is clearly prenoted by the circumſtance of Mars being the diſpoſitor of Jupiter; and that Mars is diſpoſed of by Saturn, the author of puſillanimity and fear. Thus the aſcendant of birth ſhows that want of reſolution and intrepidity in the native, which, if exerted in the favourable moment, would have turned the daggers of his enemies towards their own breaſts, and have permanently ſecured himſelf and his poſterity on the throne; and thus the figure of his decumbiture points to the fatal execution of the guillotine, and proves, that although the native ſprung from a moſt illuſtrious houſe, having the two ſuperior planets for his ſignificators, and although he was a king, at one time beloved and idolized by his people, yet that he was but a man, ſubject to the ſevereſt reverſe of fortune, and doomed to as ignominious an end as the vileſt of his ſubjects!

The elegant and accompliſhed conſort of this unfortunate monarch was born on the 2d of November, 1755, 7h. 23m. P. M. as expreſſed in the plate. In the figure of her nativity, we find the Moon is lady of the aſcendant, riſing upon the ſign Libra, in the fifth houſe, the houſe of pleaſure and ſexual enjoyment; of which, it is ſufficiently evident, ſhe was paſſionately fond. Mars being poſited on the aſcendant, in his eſſential dignities, ſhows her to have been ſtately, auſtere, and proud; yet predicts that ſhe would be unfortunate in her connections, and impatient of controul. This is the more obvious, becauſe Mars, the ſignificator and influencer of her paſſions, is dignified in her aſcendant, though approaching to an oppoſition of Saturn, lord of the ſeventh and eighth houſes, who is likewiſe configurated in his eſſential dignities, and, more extraordinary ſtill, is poſited in

the exaltation of Mars. This gave her an unconquerable ſpirit, and ſtrong natural paſſions, with an inſatiable appetite for intrigue, united to an inconſtant and arbitrary turn of mind. This is ſtill more ſtrongly demonſtrated by the preſence of four planets in the fifth houſe, and two of them aſpected in the ſign Scorpio. That her reputation would be arraigned by the voice of the multitude, is foreſhown by the Dragon's Tail being in the tenth houſe, the houſe of dignity and honour; and the treachery of her confidants is pointed out by Mercury being in the ſixth houſe, in his detriment, and in oppoſition to the Part of Fortune. That her conſort would be involved in misfortunes, and ſuffer greatly on her account, is made manifeſt by Saturn, the ſignificator of the king, being in oppoſition to Mars; and the Moon, lady of her aſcendant, in baneful quartile to both the infortunes. Indeed, there never was a nativity yet made public, wherein the infortunes were ſo miſchievouſly configurated, or wherein the general ſignificators ſo conſpicuouſly denoted individual misfortune and univerſal rage. But I ſhall paſs over, for the preſent, any farther remarks on the unfortunate deſignation of the ſignificators in this nativity, and notice them no farther than as they point out the teſtimonies of a violent and premature death. Theſe are: Firſt, the Sun and Venus, configurated with a violent fixed ſtar, in a violent ſign. Secondly, Mars aſcending to the violent fixed ſtar Hercules; and the ſign aſcending being of a violent nature. Thirdly, the lord of the eighth houſe, the houſe of death, afflicting the Moon in the aphetic place. Fourthly, the lord of the ſixth houſe afflicting the Moon, the lady of the aſcendant, and ſignificator of life, with a maleſic quartile ray, the harbinger of violence, and the preſage of death.

Thus we may obſerve, that one of the principal luminaries is afflicted by both the infortunes, and the othe ris poſited in a violent ſign, denoting aviolent death. Again, the lord of the eighth houſe, a malevolent planet, afflicted by the quartile rays of an infortune by nature, is another preſage of untimely death. Alſo the lady of the aſcendant, in a violent ſign, banefully configurated with the infortunes, and the diſpoſitor of the luminaries in a violent ſign, is an irrefragable proof of an approaching untimely death. Now, the Moon, who is lady of the aſcendant, having her fall in a human ſign, portends a violent death by the hand of man; and, if we examine the face of the heavens at the time of her execution, we ſhall find her death proceeded from the violence of an uſurped power, occupying the ſeat of juſtice; for the Moon, elevated in her aſcendant at the time of birth, is moſt remarkably configurated in the fall of the Sun at the time of her execution; and that ſame ſign culminating on the cuſp of the tenth houſe, the houſe of juſtice, and the Sun being poſited there in his fall, in conjunction with Mercury, moſt aptly deſcribes

ſcribes the manner of the native's death. Mercury, who is the natural ſignificator of the French people, being in his eſſential dignities, elevated, and in reception of Venus, lady thereof; and Mars beholding Jupiter with a quartile ray, poſited in the twelfth houſe, and lord of the aſcendant of death; and the Moon, lady of aſcendant of birth, being within orbs of an oppoſition of Mars and Venus, who have their fall in the houſe of dignity and honour; all tend to foreſhow that royalty was for a time to be deſtroyed in France; as is moſt wonderfully prenoted in the horoſcope of the coronation. And what is very remarkable, at the time of the French monarch's death, the Sun, who is king among the planets, was poſited in his own detriment, or in that peculiar point of the heavens which is oppoſed to his own houſe; and at the time of the unfortunate queen's execution, the Sun was in his fall, without a ſingle dignity to ſupport him, as is moſt clearly evinced by the horoſcopes in the preceding plate; ſo that we may ſay, the ſtars in their courſes fought againſt this illuſtrious pair, as they fought againſt Siſera of old; and thus we may perceive, that the moſt valiant and the moſt courageous are not proof againſt the ſhafts of fate; but that the nobleſt, and moſt gloriouſly clad, whether in honour, glory, or renown, are but like the offſpring of plants, which have their ſpringing up, their flowering, and their fragrant maturity; until, plucked by a rude hand, they wither, fade, and die.

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THE END.

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APPENDIX

TO

CULPEPER's BRITISH HERBAL.

HAVING given a minute deſcription of the plants and herbs contained in Culpeper's Britiſh Herbal, with their medical properties and effects, I ſhall proceed to an inveſtigationof ſome foreign trees, plants, and herbs, that are now in general uſe amongſt us. And firſt, of the

PERUVIAN OR JESUITS' BARK. CINCHONA.

CORTEX PERUVIANUS, called alſo *quinquina, kinkinna, quina-quina, pulvis patrum*, and popularly the *Jesuits' bark*, is the bark of a tree, growing in the Weſt-Indies, called by the Spaniards *palo de calenturas*, q. d. fever-wood; by reaſon of its extraordinary virtue in removing all kinds of intermitting fevers and agues. The Indians commonly call it the *fuddling-tree*, from the property it has of intoxicating fiſhes, when either its wood or bark is beaten, and ſteeped in the water where they are. The tree that yields this noble ſpecific, is only found in Peru, in the province of San Franceſco de Quito, or Quinto, near the city of Loxa; though ſome ſay it is alſo found in that of Potoſi; and F. Labat in the iſland of Guadaloupe. The bark, while on the tree, is ſtreaked, of a whitiſh yellow without-ſide, and a pale tan-colour within.

The Spaniards diſtinguiſh four ſorts of this precious bark, viz. the *caſcarilla colorada*, or reddiſh bark; *amarylla*, or yellowiſh; *creſpilla*, or curling; and *blanca*, or whitiſh. The *colorada* and *amarylla* are reckoned the beſt: the *creſpilla* is the pro-

duce of the ſame ſort of tree, only growing in a colder climate, which impairs the quality of the bark, and renders it whitiſh on the outſide, and cinnamon-coloured within, and unfit for medicinal uſe. As to the *blanca*, as it is procured from another ſpecies of the tree of a much larger trunk, the leaves of a lighter green colour, and the bark of a very thick ſpongious ſubſtance, whitiſh on the outſide; being withal ſo tough, as to require the force of an axe to ſlice it from the tree. When firſt cut down it is as bitter as the beſt ſort, and has then the ſame virtue in the cure of intermitting fevers; but when dry, and kept any length of time, it grows inſipid, and good for nothing. In reality, both ſorts are found to have much ſurer and quicker effects when green than when dry, ſo that the Europeans only come in for the ſecond-rate virtues: what is worſe, the bad ſort is in great plenty, and the good is very ſcarce, and hard to come at: for which reaſon, with a little of the fine bark ſent yearly to Panama, for Europe, large quantities of the worſt ſort are uſually mixed.

The *amarylla*, or ſmall bark, which curls up like ſticks of cinnamon, and which in England is much eſteemed, as being ſuppoſed to be taken from the branches of the tree, and therefore more efficacious in the cure of fevers, is only the bark of the younger trees; which, being very thin, curls in this manner. For the bark of the branches is never gathered; it would not compenſate the charge of cutting. The ſeaſon of cutting the bark is in Auguſt, the only ſettled dry time in the country. After a tree has been barked, it requires eighteen or twenty years for a good bark to grow again. Mr. Arrot, a Scotch ſurgeon, who had gathered the bark in the place where it grows, is of opinion, that the gathering the better ſort of bark will ſoon be at end, or at leaſt very much reduced, partly by reaſon of its diſtance from any inhabited place, and the impenetrability of the woods were it grows, and partly by the want of Indians to cut it, whoſe race, through the cruelties of the Spaniards, is likely to be totally extinct.

The moſt accurate account we have ever received of the tree which produces the *quinquina*, or true Peruvian bark, is from M. de la Condamine, who, in travelling through ſome parts of America, choſe the route of Loxa, where the fineſt bark is gathered, and where the greateſt number of the trees is found; and, taking inſtructions from M. de Juſſieu, informed himſelf concerning it. The *quinquina-tree* never grows in the plains; it is a conſtant inhabitant of the mountains, and is eaſily known from the trees among which it ſtands by its erect growth, and its height when of any conſiderable age, as it always carries its head above the reſt, and alſo by its ſize. The trees are never found in clumps or cluſters together, but always ſeparate or ſingle among other kinds. It is very rare, however, to find any large ones at this time on the mountain where the bark is gathered, the great demand for it having made

made them bark all the trees, and theſe having all periſhed by it; for the old trees never recover the barking, though the young ones frequently do.—The bark is now gathered at all times, if the weather be dry. When the bark is taken off, it is laid in the ſun till it is perfectly dry: the omitting this circumſtance, and packing up the bark while moiſt, have occaſioned it often to become mouldy, and ſpoil; and the merchants have attributed this to the taking it off in the wrong time of the moon, when it was wholly owing to its being put into the ſkin while too moiſt.

The leaves of the quinquina-tree ſtand on pedicles of about half an inch long: they are very ſmooth and gloſſy, and of a beautiful green; but ſomewhat paler on the under ſide than the upper. They are perfectly ſmooth at the edges, and are of an oblong figure, pointed at the end, and rounded at that part which joins to the ſtalk. They are from two and a half to three inches in length, and from an inch and a half to two inches in breadth. The middle rib of the leaf is rounded on the upper ſide, and is uſually of a reddiſh colour, eſpecially towards the pedicle; and the whole leaf often becomes red, when perfectly mature. All the ſmall branches towards the top of the tree terminate in one or more cluſters of flowers, which, before they are open, reſemble in ſhape and colour thoſe of the common lavender. When theſe open, they change their colour: each ſtalk that ſuſtains one of theſe cluſters ariſes from the ala of one of the leaves, and divides into many ſmall branches, each terminated by a cup divided into five parts, which ſuſtains a flower reſembling that of the hyacinth. It is compoſed of a pipe of three quarters of an inch long, which at the end is divided into five, and ſometimes into ſix, ſegments. Theſe are of a beautiful deep red within, and are ſerrated round the edges in a very elegant manner. From the bottom of the tube of the flower there ariſes a white piſtil, terminated by a long green head; this riſes above the level of the ſegments of the flower, and is ſurrounded by five ſtamina, which ſuſtain apices of a pale yellow colour: theſe remain hid within the flowers. The tube is of a dirty red, and is covered with a ſort of whitiſh down. When the flower is fallen, the cup ſwells in the middle into the form of an olive, which by degrees grows into a fruit divided into two cells, which in drying becomes ſhorter, and the whole fruit rounder than its natural condition.

This fruit finally opens longitudinally into two capſules, ſeparated by a membranaceous ſeptum, and coated by a thin yellowiſh ſkin; the ſeeds are of a reddiſh colour, and in ſhape are flattiſh, and, as it were, foliaceous; they are not more than the twentieth part of an inch in diameter, and are thickeſt in the middle, becoming thinner at each ſide. The plantula ſeminalis lies in the very centre of the ſeed, between two pellicles: theſe ſeeds are faſtened in the manner of ſo many ſcales to a placenta of an oblong figure, pointed at the two extremities, ſo as ſomewhat to reſemble

ſemble a ſeed of the common oat, but that it is longer and flatter. This is joined to the ſeptum, and has on that part a longitudinal furrow; but on the other ſide is convex, and ſomewhat rough all over. Mem. Acad. Scienc. Par. 1738. By this deſcription it appears, that they were very ignorant of the nature and characters of this tree, who, when it was firſt introduced among us, called it a ſpecies of febeſten.

The uſe of this febrifuge ſeems to have been very long known to the natives, probably as early as 1500; and their manner of taking it was by pounding the bark, laying it to infuſe in water, and drinking the infuſion; their hatred to the Spaniards, their conquerors, made them keep it a long time ſecret from them; and, when the thing became known among the inhabitants of Loxa, it ſtill remained a ſecret to the reſt of the world, and its great value was never generally known till the year 1653; when the lady of the viceroy of Peru, the Counteſs de Chinchon, being long ill of an intermitting fever, which would give way to none of the known remedies, the corregidor of Loxa ſent to the viceroy a quantity of the quinquina bark, which he aſſured him would cure the lady, though all other means had failed. Upon this the corregidor was ſent for to Lima, and, after having given the medicine to many other perſons with ſafety and ſucceſs, the lady at length took it, and was cured. She immediately on this ſent for a large quantity of the bark, had it powdered, and herſelf diſperſed it to thoſe who had occaſion for it; whence it obtained the name of the *Counteſs's powder:* but this lady, being ſoon tired of the office, gave it in charge to the Jeſuits; and, they continuing to give it to the ſick with the ſame ſucceſs, it then was called the *Jeſuits' powder.* Theſe reverend fathers ſoon found means to ſend a quantity of it to Cardinal Lugo, who diſperſed it with the ſame ſucceſs at Rome; and after him the apothecary to the college gave it gratis to the poor with the ſame good effects, under the name of the Jeſuits', or the Cardinal's, powder. Afterwards the better ſort were made to pay its weight in ſilver for it, to defray the expenſes of its importation, while the poor ſtill had it gratis. Louis XIV. at that time dauphin of France, was cured by it of a fever, which had not given way to other medicines. When the Count and Counteſs of Chinchon returned to Spain, their phyſician, Jaun de Vaga, who brought a great quantity of it over with him, ſold it at a conſiderable price; and, ſoon after this, large quantities were ſent over by the galleons: but, the great demands from Europe cauſing the inhabitants of Loxa to adulterate it with other barks, it had like to have loſt part of its juſt praiſe. The quinquina-trees are found at this time on all the chain of mountains adjoining to Cajanuma, and in many other parts of America.

When bark was firſt introduced, it is ſaid to have been ſold for about eight ſhillings ſterling the doſe; which great price, with the little effects found from it, by reaſon

reaſon of their ignorance of the manner of preparing and preſcribing it, occaſioned its being diſuſed, till about the year 1679, when Mr. Talbot, an Engliſh practitioner in phyſic, brought it into vogue again, by the great number of cures wrought about the court and city of Paris with this powder, prepared after his manner; the ſecret whereof was ſoon after made public by the munificence of Louis XIV. who rewarded Talbot for the diſcovery with 5000 crowns. The preparation is about two ounces of the cortex in powder, digeſted in a ſand-heat, with about a quart of red wine: after digeſtion, the wine muſt be poured off, and two or three ounces given every three or four hours between the paroxyſms, till the intention is anſwered.

The quinquina is ſold either in bark or in powder: thoſe who buy it in the bark muſt chooſe it very dry and compact; ſuch as has never been moiſtened, and which will break cloſe and ſmooth, is friable between the teeth, is eaſily pulverized, and yields a powder of a pale cinnamon-colour. It has a muſty kind of ſmell, and yet ſo much of the aromatic as not to be diſagreeable. The inferior kinds, when broken, appear woody, and on chewing ſeparate into fibres. The female bark is conſiderably thicker, whiter on the outſide, redder within, and weaker in ſmell and taſte, than the former, and much inferior in medicinal virtue. The ſmall fine quilled barks, ſhagreened without and reddiſh within, of a bitter muſty taſte, are the moſt eſteemed. The powder muſt be well ſifted, and care be taken to buy it of perſons that may be truſted; it being very eaſy to ſophiſticate it, and difficult to find out the fraud. The red bark, lately brought into reputation by the experiments of the ingenious Dr. Saunders, poſſeſſes the virtues of the common bark in a much higher degree. A quantity of it was introduced to London, as part of the cargo of a Spaniſh ſhip from Lima, taken by an Engliſh frigate in 1779, and carried into Liſbon. Whether this is the bark of the trunk of full-grown trees, the branches, or young trees yielding the pale bark, or whether the trees be of different ſpecies, is not yet accurately determined. In the province of Santa-Fe, there have been lately diſcovered two kinds of cinchona; one of which is the red bark of Peru; and the other, one of the white ſpecies.

The cortex is a bitter, abſorbent, and aſtringent, or ſtyptic: from its bitterneſs, M. Reneaume obſerves it becomes fit to ſoften ſour acrimonious juices; for a ſour and a bitter make a ſweet. Again, as an abſorbent, it blunts the points of acids, and prevents their action; and, of conſequence, preſerves the fluidity of the juices, which acids would coagulate. As a ſtyptic, it muſt have earthy parts to abſorb ſeroſities, by which the parts, before moiſtened and relaxed, will contract themſelves; and, by this means, the cortex augments the ſpring and tenſion of the fibres. As a bitter, it warms; and it faciliates perſpiration by warming and augmenting

the fluidity of the juices. Its primary operation is that of ſtrengthening the ſolids. On theſe properties it is that its medical uſes are founded. Its chief operation is in curing of agues, and intermitting fevers; for which purpoſe it is applied in all ages and moſt conſtitutions. It produces this effect better than any other medicine of the ſame intention, in the ratio of 365 to 1. It is uſual to give a gentle emetic of ipecacuanha before the exhibition of the cortex: by thus preparing the paſſages, the cortex has not only more ſucceſs, but alſo is not ſubject to cauſe thoſe indiſpoſitions, viz. ſwelling in the belly, nauſeas, &c. which often ariſe when ſuch preparation is neglected. The cortex muſt never be exhibited in the paroxyſm of an ague, or intermitting fever; but given in ſuch a quantity, at times, between the paroxyſms, as to prevent a return of the fit. The cortex exhibited in continual fevers, is held dangerous; and care muſt be taken, that the remiſſion of a continual fever be not miſtaken for its intermiſſion, which happens at particular or ſtated times. The cortex is given ſeveral ways, viz. in powder, in form of electuary, extract, bolus, infuſion, tincture, &c. When the ſtomach will bear it, the preparation in very fine powder is the moſt uſeful and agreeable.

If the bark take downward, Venice treacle, diaſcordium, conſerve of roſes, terra Japonica, doſes of laudanum, &c. muſt be added to its preparations. When there happens to be an obſtruction of the menſes from the exhibition of the cortex, or to prevent it, it is adviſeable to add to its preparations black hellebore, æthiops mineral, cinnabar, &c. The cortex is often uſed for young children in agues, by way of clyſter; and alſo applied to the wriſts, and ſoles of the feet, wrought up in a ſtiff maſs, with turpentine, Venice treacle, &c. which uſually anſwers the purpoſe. John Helvetius, phyſician to the King of France, above ſixty years ago, wrote a book entirely upon the ſubject of curing agues by giving the cortex clyſter-wiſe; in which he pretends, that this is a more ſafe, and no leſs certain, than when it is given by the mouth. Dr. Cockburn, in his Treatiſe of Sea Diſeaſes, aſſerts the contrary: he alleges, that the cortex given inwardly is as ſafe, and much more certain and expeditious; and notes, that we know how to remedy all the inconveniences the cortex may occaſion. Dr. Sydenham, and after him Mr. Reneaume and others, have preſcribed the cortex, with ſucceſs, in melancholic and hyſteric affections, commonly called vapours.

The virtues of this medicine are at this time ſufficiently known; but the largeneſs of its doſe in the common forms of powder, or infuſion in wine or in water, are great diſadvantages; and our common methods of giving it in the extract or reſin, as we prepare them, not certain, nor without inconvenience. Mr. Geoffroy has attempted a method of giving the bark in all its efficacy, without its ill taſte, and in

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one third of the uſual doſe, by means of its dry extract; twenty-four grains of which, it is aſſerted, contain the whole efficacy of a dram of the choiceſt bark in powder. Hence it appears very evident, that when we take the bark in ſubſtance, it is only about a third part of what we are forced to ſwallow that can be of any uſe to us; and that the ſame portion is all we can expect in the virtues of any decoction or infuſion of it. *Mem. Acad. Sci. Par.* 1758.

Wine, which is a liquor partly aqueous, partly ſaline, and partly ſpirituous, is a menſtruum much properer to extract the virtues of the bark than mere water, as it is much more able to diſſolve the juices or ſap condenſed and inſpiſſated in the bark of the tree; and for this reaſon a ſtrong infuſion of bark in this menſtruum remains clear, and keeps the reſin ſuſpended when cold; in which reſpect it differs from the infuſion in boiling water when cooled, as the reſin precipitates itſelf. Thus it is the fire alone which can ſuſpend the reſin in a watery infuſion of the bark; and in a vinous one, the ſpirituous and inflammable part of the liquor does the ſame thing: and as the reſin of the bark, which there is great reaſon to believe poſſeſſes all the virtues of that medicine, is wholly precipitated from watery infuſions when cold, it has been ſaid there can be but very little dependence placed on the common clear infuſions in this menſtruum: the remaining taſte in theſe infuſions is only a faint bitterneſs, which ariſes from the gummoſe and ſaline parts of the dried juices of the bark: the whole concrete, which alone poſſeſſes the virtue of the medicine, being of the nature of thoſe bodies properly called *gum reſins*, which are but very imperfectly ſoluble in water, and of which wine is the proper diſſolvent. It has been found, that cold water, acting more gradually than boiling water, extracts both the gummy and reſinous principles of bark. And infuſions made by macerating one ounce of bark in fine powder, in eight or twelve of water, without heat, for twenty-four (or even twelve) hours, have been ſucceſsfully adminiſtered in doſes (of the clear liquor) of two or three ounces. It is a common opinion, that bark in ſubſtance is more effectual than any preparation of it. *Lewis, Mat. Med.*

Peruvian bark has been found very effectual in preventing colds. The method in which it was uſed, in a caſe mentioned in the Philoſophical Tranſactions, was, after due preparation by bleeding or purging, to take two ounces of it every ſpring and fall. By this method, an habitual taking of cold, and a conſequent ſore throat, was cured. *Phil. Tranſ.* No. 478. p. 3.

The antiſeptic power of the bark has been abundantly evinced, and we have many accounts of its great effects in the cure of gangrenes and mortifications. See Med. Eſſ. Edinb. vol. iii. art. 5. We have alſo ſeveral accounts of the good effects of this medicine in ulcers and the ſmall-pox, and alſo in ſcrophulous complaints.

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The bark probably in caſes of this kind throws off by fermentation a quantity of ſubtile vapour, or fixed air, which is ſufficient to ſaturate the acrimonious matter; and, even when the putrefaction has made farther advances, larger quantities of this medicine will diſcharge more of the antiſeptic vapour, which, reaching the blood, will reſtore its conſiſtence, and correct its ſharpneſs. Macbride's Eſſays, edit. 3. p. 140, &c. The bark has alſo been applied, in conjunction with other medicines, to the cure of periodical head-achs, hyſterical, hypochondriacal, vertiginous, and epileptic, complaints. And it is a very uſeful medicine in weakneſs of the ſtomach, uterine fluxes, and ſundry chronical diſeaſes proceeding from a laxity and debility of the fibres.

Many inſtaaces are recorded by medical writers of the jaundice, dropſy, aſthma, and all the train of nervous diſorders, brought on in a ſurpriſing ſhort time after an injudicious adminiſtration of the bark: among others, the curious may conſult the Med. Eſſ. Edinb. vol. iv. art. 24. The Peruvian bark is diſcovered to be effectual in the cure of mortifications from an internal cauſe. The hiſtory of this diſcovery is: In 1715, Mr. Ruſhworth, ſurgeon in Northampton, gave it to a patient labouring under a mortification; and, having afterwards other proofs of its good effects in this diſeaſe, communicated his diſcovery in 1731. Mr. Amyand ſoon tried it in ſuch caſes, and found it ſucceſsful in ſeven. Mr. John Douglas confirmed this by the hiſtory of a patient of his, which he publiſhed in 1732; and Mr. Shipton ſoon after related his ſucceſs by this medicine to the Royal Society. Mr. Ruſhworth and Mr. Amyand confirmed its uſe in mortifications from an internal cauſe; the former thinks it is not proper in all caſes of that kind, particularly where there is no intermiſſion in the fever. Mr. Douglas ſeems to think it will ſucceed in all mortifications. All theſe three gentlemen gave half a dram for a doſe every fourth hour. Mr. Shipton increaſed the doſe of two ſcruples, and gave it while the fever continued. He propoſed to have it tried in nomæ, phagedenæ, herpes, or other chironion ulcers.

Some call the gentian-root the European quinquina, becauſe good againſt intermitting fevers. The ſea-ſide beech of Jamaica, or Cinchona Carribæa of Linnæus, is a ſpecies of the Jeſuits' bark, produced in Jamaica and the Carribee iſlands, which, together with its virtues, has been accurately deſcribed by Dr. Wright, who found it very efficacious in the dangerous remittent fevers of the Weſt Indies; and it has been lately adminiſtered in London in intermittents, in which it has effected a cure as completely as the Peruvian bark. *Phil. Tranſ.* vol. lxvii. 504. *Med. Com.* vol. v. p. 398. part 2.

BREAD-

BREAD-FRUIT TREE. Artocarpus.

THIS tree is called *artocarpus*, (from αρτος, bread, and καρπος, fruit;) and is a genus of the monandria order, belonging to the monœcia clafs, of plants. It has a cylindric amentum or catkin, which thickens gradually, and is covered with flowers; the male and female in a different amentum. In the male, the calyx is two-valved, and the corolla is wanting. In the female, there is no calyx nor corolla; the ftylus is one, and the drupa is many-celled.

Though this tree has been mentioned by many voyagers, particularly by Dampier, by Rumphius, and by Lord Anfon, yet very little notice feems to have been taken of it till the return of Captain Wallis from the South Seas, and fince that time by others who have touched at Otaheite, and fome other countries in the Eaft-Indies. Captain Dampier relates, that in Guam, one of the Ladrone iflands, "there is a certain fruit called the bread-fruit, growing on a tree as big as our large apple-trees, with dark leaves. The fruit is round, and grows on the boughs like apples, of the bignefs of a good penny loaf; when ripe, it turns yellow, foft, and fweet: but the natives take it green, and bake it in an oven till the rind is black: this they fcrape off, and eat the infide, which is foft and white, like the infide of new-baked bread, having neither feed nor ftone; but, if it is kept above twenty-four hours, it is harfh. As this fruit is in feafon eight months in the year, the natives feed upon no other fort of bread during that time. They told us that all the Ladrone iflands had plenty of it. I never heard of it in any other place."

Rumphius, after defcribing the tree, obferves, that "the fruit is fhaped like a heart, and increafes to the fize of a child's head. Its furface or rind is thick, green, and covered every-where with warts of a quadragonal or hexagonal figure, like cut diamonds, but without points. The more flat and fmooth thefe warts are, the fewer feeds are contained in the fruit, and the greater is the quantity of pith, and that of a more glutinous nature. The internal part of the rind, or peel, confifts of a fleshy fubftance, full of twifted fibres, which have the appearance of fine wool; thefe adhere to, and in fome meafure form, it. The fleshy part of this fruit becomes fofter towards the middle, where there is a fmall cavity formed without any nuts or feeds, except in one fpecies, which has but a fmall number; and this fort is not good, unlefs it is baked or prepared fome other way; but, if the outward rind be taken off, and the fibrous flefh dried, and afterwards boiled with meat, as we do cabbage, it has then the tafte of artichoke-bottoms. The inhabitants of Amboyna drefs it in the liquor of cocoa-nuts; but they prefer it roafted on coals till the outward part or peel is burnt. They afterwards cut it into pieces, and eat it with the milk of the cocoa-nut.

Some people make fritters of it, or fry it in oil; and others, as the Sumatrians, dry the internal ſoft part, and keep it to uſe inſtead of bread with other food. It affords a great deal of nouriſhment, and is very ſatisfying; therefore proper for hard-working people; and, being of a gentle aſtringent quality, is good for perſons of a laxative habit of body.

" It is more nouriſhing boiled in our manner, with fat meat, than roaſted on coals. The milky juice which diſtils from the trunk, boiled with the cocoa-nut oil, makes a very ſtrong bird-lime. This tree is to be found on the eaſtern parts of Sumatra, and in the Malay language is called *ſoccus* and *ſoccum capas.* It grows likewiſe about the town of Bantam, in Java, and in Ballega and Madura; and is known there by the name of *ſoccum.*"

In Anſon's voyage we are informed, " that the *rima,* or bread-fruit tree, is common in all the Ladrone iſlands, and ſome of the Philippines. It is ſomewhat larger than our apple-tree, and bears a broad dark-coloured leaf with five indentures on each ſide. The fruit hangs on boughs like apples, and is of the ſize of a penny loaf, with a thick tough rind, which when full ripe turns yellow. The natives gather it before it is quite ripe, and bake it till the cruſt is pretty black; then they raſp it, and there remains a pretty loaf, with a tender yellow cruſt, and the crumb of it is ſoft and ſweet as a new-baked roll: it is without any ſeeds or ſtones. This fruit the inhabitants enjoy for about ſeven months; during which they never eat any other kind of bread: but they are obliged to bake it every day; for, when it grows a little ſtale, it becomes harſh and huſky, ſomewhat like the potatoe-bread made in the weſt of England. There is, however, a remedy for this; which is cutting the loaf into ſlices when it is new, and drying it in the ſun, by which it is changed into the pleaſanteſt ruſk that can be eaten."

Captain Cook, in his voyage, obſerves, that this fruit not only ſerves as a ſubſtitute for bread among the inhabitants of Otaheite and the neighbouring iſlands, but alſo, variouſly dreſſed, compoſes the principal part of their food. It grows on a tree that is about the ſize of a middling oak; its leaves are frequently a foot and a half long, of an oblong ſhape, deeply ſinuated like thoſe of the fig-tree, which they reſemble in colour and conſiſtence, and in the exſuding of a milky juice upon being broken. The fruit is about the ſize and ſhape of a new-born child's head; and the ſurface is reticulated, not much unlike a truffle; it is covered with a thin ſkin, and has a core about as big as the handle of a ſmall knife. The eatable part lies between the ſkin and the core; it is as white as ſnow, and ſomewhat of the conſiſtence of new bread; it muſt be roaſted before it is eaten, being firſt divided into three or four parts; its taſte is inſipid, with a ſlight ſweetneſs ſomewhat reſembling that of the crumb

crumb of wheaten bread mixed with a Jeruſalem artichoke. This fruit is alſo cooked in a kind of oven, which renders it ſoft, and ſomething like a boiled potatoe; not quite ſo farinaceous as a good one, but more ſo than thoſe of the middling ſort. Of the bread-fruit they alſo make three diſhes, by putting either water or the milk of the cocoa-nut to it, then beating it to a paſte with a ſtone peſtle, and afterwards mixing it with ripe plantains, bananas, or the ſour paſte which they call mahie.

The *mahie*, which is likewiſe made to ſerve as ſuccedaneum for ripe bread-fruit before the ſeaſon comes on, is thus made: The fruit of the bread tree is gathered juſt before it is perfectly ripe; and, being laid in heaps, is cloſely covered with leaves: in this ſtate it undergoes a fermentation, and becomes diſagreeably ſweet: the core is then taken out entire, which is done by gently pulling out the ſtalk, and the reſt of the fruit is thrown into a hole which is dug for that purpoſe generally in the houſes, and neatly lined in the bottom and ſides with graſs: the whole is then covered with leaves, and heavy ſtones laid upon them; in this ſtate it undergoes a ſecond fermentation, and becomes ſour, after which it will ſuffer no change for many months. It is taken out of the hole as it is wanted for uſe; and, being made into balls, it is wrapped up into leaves and baked: after it is dreſſed, it will keep five or ſix weeks. It is eaten both cold and hot; and the natives ſeldom make a meal without it, though to Europeans the taſte is as diſagreeable as that of a pickled olive generally is the firſt time it is eaten. The fruit itſelf is in ſeaſon eight months in the year; and the mahie ſupplies the inhabitants during the other four.

To procure this principal article of their food (the bread-fruit) coſts theſe happy people no trouble or labour except climbing up a tree. The tree which produces it does not indeed grow ſpontaneouſly; but, if a man plants ten of them in his lifetime, which he may do in about an hour, he will as completely fulfil his duty to his own and future generations as the native of our leſs temperate climate can do by ploughing in the cold of winter, and reaping in the ſummer's heat, as often as theſe ſeaſons return; even, if, after he has procured bread for his preſent houſehold, he ſhould convert a ſurplus into money, and lay it up for his children.

There are two ſpecies of artocarpus, viz. the inciſus, with gaſhed leaves; and the integrifolia, with entire leaves. There is alſo ſaid to be another diſtinction, into that which bears fruit with ſtones or ſeeds, and that in which the fruit has none. The parts of fructification of that tree which bears the fruit without ſtones are defective. The amentum, or catkin, which contains the male parts, never expands. The ſtyli, or female part of the fruit, are likewiſe deficient. From which it follows that there can be no ſtones or ſeeds, and therefore that this tree can be propagated only by ſuckers or layers; although it is abundantly evident that it muſt originally have

have proceeded from the ſeed-bearing bread-fruit tree. Inſtances of this kind we ſometimes find in European fruits; ſuch as the barberry, and the Corinthian grape from Zant, commonly called currants, which can therefore be increaſed only by layers and cuttings. Dr. Solander was aſſured by the oldeſt inhabitants of Otaheite and the adjoining iſlands, that they well remember there was formerly plenty of the ſeed-bearing bread-fruit; but they had been neglected upon account of the preference given to the bread-fruit without ſeeds, which they propagate by ſuckers.

CASHEW-NUT TREE. Anacardium.

ANACARDIUM, the caſhew-nut tree, is a genus of the monogynia order, belonging to the decandria claſs, of plants; and in the natural method ranking under the twelfth order, holoraceæ. The characters are: The calyx is divided into five parts, the diviſions ovate and deciduous; the corolla conſiſts of five reflected petals, twice the length of the calyx; the ſtamina conſiſt of ten capillary filaments ſhorter than the calyx, one of them caſtrated; the antheræ are ſmall and roundiſh: the piſtil has a roundiſh germen; the ſtylus is ſubulated, inflected, and the length of the corolla; the ſtigma oblique: there is no pericarpium; the receptaculum is very large and fleſhy: the ſeed is a large kidney-ſhaped nut, placed above the receptaculum.

Of this only one ſpecies is as yet known to the botaniſts, viz. the occidentale. It grows naturally in the Weſt Indies, and arrives at the height of 20 feet in thoſe places of which it is a native; but cannot be preſerved in Britain without the greateſt difficulty. The fruit of this tree is as large as an orange; and is full of an acid juice, which is frequently uſed in making punch. To the apex of this fruit grows a nut, of the ſize and ſhape of a hare's kidney, but much larger at the end which is next the fruit than at the other. The ſhell is very hard; and the kernel, which is ſweet and pleaſant, is covered with a thin film. Between this and the ſhell is lodged a thick, blackiſh, inflammable, liquor, of ſuch a cauſtic nature in the freſh nuts, that, if the lips chance to touch it, bliſters will immediately follow. The kernels are eaten raw, roaſted, or pickled. The cauſtic liquor juſt mentioned is eſteemed an excellent coſmetic with the Weſt-India young ladies, but they muſt certainly ſuffer a great deal of pain in its application; and, as fond as our Britiſh females are of a beautiful face, it is highly probable they would never ſubmit to be flayed alive to obtain one. When any of the former fancy themſelves too much tanned by the ſcorching rays of the ſun, they gently ſcrape off the thin outſide of the ſhell, and then rub their faces all over with the ſtone. Their faces immediately ſwell

Dodd del. Pass Sculp.

Canella Alba.

ſwell and grow black: and the ſkin, being poiſoned by the cauſtic oil above-mentioned, will in the ſpace of five or ſix days come entirely off in large flakes, ſo that they cannot appear in public in leſs than a fortnight, by which time the new ſkin looks as fair as that of a new-born child. The negroes in Braſil cure themſelves effectually of diſorders in the ſtomach by eating of the yellow fruit of this tree; the juice of which, being acid, cuts the thick tough humours which obſtructed the free circulation of the blood, and thus removes the complaint. This cure, however, is not voluntary: for their maſters, the Portugueſe, deny them any other ſuſtenance; and letting them looſe to the woods, where the caſhew-nuts grow in great abundance, leave it in their option to periſh by famine, or ſuſtain themſelves with this fruit. The milky juice of this tree will ſtain linen of a good black, which cannot be waſhed out.

This plant is eaſily raiſed from the nuts, which ſhould be planted each in a ſeparate pot filled with light ſandy earth, and plunged into a good hot-bed of tanners' bark; they muſt alſo be kept from moiſture till the plants come up, otherwiſe the nuts are apt to rot. If the nuts are freſh, the plants will come up in about a month; and in two months more they will be four or five inches high, with large leaves: from which quick progreſs many people have been deceived, imagining they would continue the like quick growth afterwards; but, with all the care that can be taken, they never exceed the height of two feet and a half, and for the moſt part ſcarcely half as much. The Indians eat the nuts ſlightly roaſted, dipped in water or wine, and ſprinkled with ſalt, as a provocative to venery, to which they are found a moſt remarkable ſtimulus. The juice will ſtop a diarrhœa, and cure a diabetes; and the oil is uſed by painters to give their colours a laſting black, and to preſerve wood from putrefaction.

CANELLA ALBA, or WHITE CINNAMON.

THE canella is a genus of the monogynia order, belonging to the dodecandria claſs, of plants; and in the natural method ranking under the twelfth order, holoraceæ. The calyx is three-lobed; the petals are five; the antheræ ſixteen, growing to an urceolated or bladder-ſhaped nectarium; and the fruit is a tricocular berry, with two ſeeds. There is but one ſpecies, the *alba;* which grows uſually about twenty feet high, and eight or ten inches in thickneſs, in the thick woods of moſt of the Bahama iſlands. The leaves are narrow at the ſtalk, growing wider at their ends, which are broad and rounding, having a middle rib only; they are very ſmooth, and of a light ſhining green. In May and June the flowers, which are pentapetalous, come forth in cluſters at the ends of the branches: they are red, and very fragrant; and are ſucceeded by round berries, of the ſize of large peaſe, green, and when

ripe (which is in February) purple, containing two ſhining black ſeeds, flat on one ſide, otherwiſe not unlike in ſhape to a kidney-bean: theſe ſeeds in the berry are enveloped in a ſlimy mucilage. The whole plant is very aromatic, the bark particularly, being more uſed in diſtilling, and in greater eſteem, in the more northern parts of the world than in Britain.

The bark is the canella alba of the ſhops. It is brought to us rolled up into long quills, thicker than cinnamon, and both outwardly and inwardly of a whitiſh colour, lightly inclining to yellow. Infuſions of it in water are of a yellowiſh colour, and ſmell of the canella; but they are rather bitter than aromatic. Tinctures in rectified ſpirit have the warmth of the bark, but little of its ſmell. Proof-ſpirit diſſolves the aromatic as well as the bitter matter of the canella, and is therefore the beſt menſtruum.

The canella is the interior bark freed from an outward thin rough one, and dried in the ſhade. The ſhops diſtinguiſh two ſorts of canella, differing in the length and thickneſs of the quills: they are both the bark of the ſame tree; the thicker being taken from the trunk, and the thinner from the branches. This bark is a warm pungent aromatic, though not of the moſt agreeable kind; nor are any of the preparations of it very grateful.

Canella alba is often employed where a warm ſtimulant to the ſtomach is neceſſary, and as a corrector of other articles. It is now, however, little uſed in compoſitions by the London College; the only officinal formula which it enters being the pulvis aloeticus: but with the Edinburgh College it is an ingredient in the tinctura amara, vinum amarum, vinum rhei, &c. It is uſeful as covering the taſte of ſome other articles.—This bark has been confounded with that called winter's bark, which belongs to a very different tree.

COFFEE-TREE. Coffea.

THE coffee-tree is ſuppoſed to be a native of Arabia Felix. It ſeldom riſes more than ſixteen or eighteen feet in height; the main ſtem grows upright, and is covered with a light-brown bark; the branches are produced horizontally and oppoſite, croſſing each other at every joint; ſo that every ſide of the tree is fully garniſhed with them, and they form a ſort of pyramid. The leaves alſo ſtand oppoſite; and, when fully grown, are about four or five inches long, and two broad in the middle, decreaſing toward each end; the borders are waved, and the ſurface is of a lucid green. The flowers are produced in cluſters at the root of the leaves, ſitting cloſe to the branches; they are tubulous, and ſpread open at the top, where they are divided into five parts; they are of a pure white, and have a very grateful odour, but are of ſhort duration. The fruit, which is the only uſeful part, reſembles a cherry.

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The Coffee Tree.

It grows in cluſters, and is ranged along the branches under the axillæ of the leaves, of the ſame green as the laurel, but ſomething longer. When it comes to be of a deep red, it is gathered for the mill, in order to be manufactured into thoſe coffee-beans now ſo generally known. The mill is compoſed of two wooden rollers furniſhed with iron plates eighteen inches long, and ten or twelve in diameter. Theſe moveable rollers are made to approach a third which is fixed, and which they call the chops. Above the rollers is a hopper, in which they put the coffee, from whence it falls between the rollers and the chops, where it is ſtripped of its firſt ſkin, and divided into two parts, as may be ſeen by the forms of it after it has undergone this operation; being flat on the one ſide and round on the other. From this machine it falls into a braſs ſieve, where the ſkin drops between the wires, while the fruit ſlides over them into baſkets placed ready to receive it: it is then thrown into a veſſel full of water, where it ſoaks for one night, and is afterwards thoroughly waſhed. When the whole is finiſhed, and well dried, it is put into another machine called the peeling-mill. This is a wooden grinder, turned vertically upon its trendle by a mule or a horſe. In paſſing over the coffee it takes off the parchment, which is nothing but a thin ſkin that detaches itſelf from the berry in proportion as it grows dry. The parchment being removed, it is taken out of this mill to be put into another, which is called the winnowing-mill. This machine is provided with four pieces of tin fixed upon an axle, which is turned by a ſlave with conſiderable force; and the wind that is made by the motion of theſe plates clears the coffee of all the pellicles that are mixed with it. It is afterwards put upon a table, where the broken berries, and any filth that may remain among them, are ſeparated by negroes; after which the coffee is fit for ſale. The coffee-tree is cultivated in Arabia, Perſia, the Eaſt-Indies, the Iſle of Bourbon, and ſeveral parts of America. It is alſo raiſed in botanic gardens in many parts of Europe. Prince Eugene's garden at Vienna produced more coffee than was ſufficient for his own conſumption. It delights particularly in hills and mountains, where its root is almoſt always dry, and its head frequently watered with gentle ſhowers. It prefers a weſtern aſpect, and ploughed ground without any appearance of graſs. The plants ſhould be placed at eight feet diſtance from each other, and in holes twelve or fifteen inches deep. If left to themſelves, they would riſe to the height of ſixteen or eighteen feet, as already obſerved; but they are generally ſtinted to five, for the conveniency of gathering their fruit with the greater eaſe. Thus dwarfed, they extend their branches ſo, that they cover the whole ſpot round about them. They begin to yield fruit the third year. but are not in full bearing till the fifth. With the ſame infirmities that moſt other trees are ſubject to, theſe are likewiſe in danger of being deſtroyed by a worm or by the ſcorching rays of the ſun. The hills where the coffee-trees are found have ge-

nerally a gravelly or chalky bottom. In the laſt, it languiſhes for ſome time and then dies: in the former, its roots, which ſeldom fail of ſtriking between ſtones, obtain nouriſhment, and keep the tree alive and fruitful for thirty years. This is nearly the period for plants of the coffee-tree. The proprietor, at the end of this period, not only finds himſelf without trees, but has his land ſo reduced, that it is not fit for any kind of culture; and, unleſs he is ſo ſituated, that he can break up a ſpot of virgin land, to make himſelf amends for that which is totally exhauſted by the coffee-trees, his loſs is irreparable.

The coffee produced in Arabia is found ſo greatly to excel that raiſed in the American plantations or elſewhere, that the cultivation of the tree is now but ſeldom practiſed in any of the Britiſh colonies. Large plantations of this kind were formerly made in ſome of them; and it was propoſed to the parliament to give a proper encouragement for cultivating this commodity there, ſo as to enable the planters to underſell the importers from Arabia. Accordingly there was an abatement of the duty payable on all coffee imported from our colonies in America, which at that time was ſuppoſed to be ſufficient encouragement for this kind of commerce; but the inferiority of the American coffee to the Arabian almoſt ruined the project. The late Mr. Miller propoſed ſome improvements in the method of cultivation. According to him, the trees are planted in too moiſt a ſoil, and the berries are gathered too ſoon. They ought, he ſays, to be permitted to remain on the trees till their ſkins are ſhrivelled, and they fall from the trees when ſhaken. This will indeed greatly diminiſh their weight, but the value of the commodity will thereby be increaſed to more than double of that which is gathered ſooner. In Arabia, they always ſhake the berries off the trees, ſpreading cloths to receive them, and only take ſuch as readily fall at each time. Another cauſe may be the method of drying the berries. They are, he obſerves, very apt to imbibe moiſture, or the flavour of any thing placed near them. A bottle of rum placed in a cloſet in which a caniſter of coffee-berries cloſely ſtopped was ſtanding on a ſhelf at a conſiderable diſtance, in a few days ſo impregnated the berries as to render them very diſagreeable: the ſame has alſo happened by a bottle of ſpirit of wine ſtanding in the ſame cloſet with coffee and tea, both which were in a few days ſpoiled by it. Some years ago, a coffee-ſhip from India had a few bags of pepper put on-board, the flavour of which was imbibed by the coffee, and the whole cargo ſpoiled. For theſe reaſons, Mr. Miller directs that coffee-berries ſhould never be brought over in ſhips freighted with rum, nor laid to dry in the houſes where ſugars are boiled or rum diſtilled. When they are fully ripe, they ſhould be ſhaken off while the trees are perfectly dry, and ſpread upon cloths in the ſun, carrying them every evening under cover, to prevent the dews or rain from falling on them. When perfectly dry, they ſhould

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have their outer ſkins beaten off, and then be carefully packed up in cloths or bags three or four times double.

The coffee-tree, as we have already obſerved, is ſometimes cultivated in European gardens: but for this it requires the aſſiſtance of a ſtove. It makes a fine appearance at all ſeaſons of the year (being an evergreen), but eſpecially when in flower, and when the berries are red, which is generally in the winter, ſo that they continue a long time in that ſtate. It is propagated from the berries: but they muſt be planted immediately when gathered from the tree, for they loſe their vegetative quality in a very ſhort time: when they have been ſent abroad, they have conſtantly failed in thoſe that have been a fortnight on their journey; ſo that, where theſe trees are deſired, the young plants muſt be ſent, if it be at any diſtance from the place where they grow. The freſh berries may be planted in ſmall pots, and plunged into a hot-bed of tanner's bark. If the bed be of a proper temperature, the young plants will appear in a month or five weeks time; and in ſix weeks more will be ready for tranſplanting into ſeveral pots. During ſummer, they muſt be frequently watered; but not in too great plenty, otherwiſe the roots will be apt to rot. The firſt ſign of the plants being diſordered is their leaves ſweating out a clammy juice; after which they are over-run with inſects, that cannot be deſtroyed till the plants have recovered their health; ſo that, on the firſt appearance of theſe inſects, the trees ſhould be removed into freſh earth, and all poſſible care taken to recover them. The diſorders incident to them, generally proceed either from their having been put into large pots, or from the earth about them being too ſtiff or over-watered. The moſt proper ſoil for them is that of a kitchen-garden, which is naturally looſe, and not ſubject to bind, eſpecially if it has conſtantly been well wrought and dunged.

Explanation of the Plate.

a, repreſents the flower, cut open to ſhow the ſituation of the five filaments, with their ſummits lying upon them.

b, the flower-cup, with its four ſmall indentations, incloſing the germen, or embryo ſeed-veſſel; from the middle of which ariſes the ſtyle, terminated by the two reflexed ſpongy tops.

c, the fruit entire; marked at the top with a puncture, like a navel.

d, the fruit open, to ſhow that it conſiſts of two ſeeds; which are ſurrounded by the pulp.

e, the fruit cut horizontally, to ſhow the ſeeds as they are placed erect, with their flat ſides together.

f, one of the ſeeds taken out, with the membrane or parchment upon it.

g, the ſame, with the parchment torn open, to give a view of the ſeed.

h, the ſeed without the parchment.

The origin of coffee as a common drink is not well known. Some aſcribe it to the prior of a monaſtery; who, being informed by a goat-herd, that his cattle ſometimes browzing on the tree would awake and caper all night, became curious to prove its virtue: accordingly, he firſt tried it on his monks, to prevent their ſleeping at matins. Others, from Sehehabeddin, refer the firſt uſe of coffee to the Perſians: from whom it was learned in the 15th century by Gemaleddin, mufti of Aden, a city near the mouth of the Red Sea; and who, having tried its virtues himſelf, and found that it diſſipated the fumes which oppreſſed the head, inſpired joy, opened the bowels, and prevented ſleep, without being incommoded by it, recommended it firſt to his derviſes, with whom he uſed to ſpend the night in prayer. Their example brought coffee into vogue at Aden; the profeſſors of the law for ſtudy, artiſans to work, travellers to walk in the night, in fine, every body at Aden drank coffee. Hencé it paſſed to Mecca; where firſt the devotees, then the reſt of the people, took it. From Arabia Felix it paſſed to Cairo. In 1511, Kahie Beg prohibited it, from a perſuaſion that it inebriated, and inclined to things forbidden. But Sultan Cauſou ſoon after took off the prohibition; and coffee advanced from Egypt to Syria and Conſtantinople. Thevenot, the traveller, was the firſt who brought it into France; and a Greek ſervant, named Paſqua, brought into England by Mr. Daniel Edwards, a Turkey merchant, in 1652, to make his coffee, firſt ſet up the profeſſion of coffee-man, and introduced the drink into this iſland.

In the year 1714, the magiſtrates of Amſterdam, in order to pay a compliment to Louis XIV. king of France, preſented to him an elegant plant of this rare tree, carefully and judiciouſly packed up to go by water, and defended from the weather by a curious machine covered with glaſs. The plant was about five feet high, an inch in diameter in the ſtem, and was in full foliage, with both green and ripe fruit. It was viewed in the river, with great attention and curioſity, by ſeveral members of the Academy of Sciences, and was afterwards carried to the royal garden at Marly, under the care of Monſieur de Juſſieu, the king's profeſſor of botany; who had, the year before, written a memoir, printed in the Hiſtory of the Academy of Sciences of Paris, deſcribing the characters of this genus, together with an elegant figure of it, taken from a ſmaller plant, which he had received that year from Mynheer Pancras, burgomaſter of Amſterdam, and director of the botanical garden there.

In 1718, the Dutch colony at Surinam began firſt to plant coffee; and, in 1722, Monſieur de la Motte Aigron, governor of Cayenne, having buſineſs at Surinam, contrived, by an artifice, to bring away a plant from thence, which, in the year 1725, had produced many thouſands.

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In 1727, the French, perceiving that this acquiſition might be of great advantage in their colonies, conveyed to Martinico ſome of the plants; from whence it moſt probably ſpread to the neigbouring iſlands; for, in the year 1732, it was cultivated in Jamaica, and an act paſſed to encourage its growth in that iſland.—Thus was laid the foundation of a moſt extenſive and beneficial trade to the European ſettlements in the Weſt-Indies.

The preparation of coffee conſiſts in roaſting, or giving it a juſt degree of torrefaction, on an earthen or metalline plate, till it has acquired a browniſh hue equally deep on all ſides. It is then ground in a mill, as much as ſerves the preſent occaſion. A proper quantity of water is next boiled, and the ground coffee put into it. After it has juſt boiled, it is taken from the fire, and, the decoction having ſtood a while to ſettle and fine, they pour or decant it into diſhes. The ordinary method of roaſting coffee amongſt us is in a tin cylindrical box full of holes, through the middle whereof runs a ſpit: under this is a ſemicular hearth, whereon is a large charcoal-fire: by help of a jack the ſpit turns ſwift, and ſo roaſts the berry; being now and then taken up to be ſhaken. When the oil riſes, and it is grown of a dark-brown colour, it is emptied into two receivers made with large hoops whoſe bottoms are iron plates: there the coffee is ſhaken, and left till almoſt cold; and, if it looks bright and oily, it is a ſign it is well done.

Very different accounts have been given of the medicinal qualities of this berry. To determine its real effects on the human body, Dr. Percival has made ſeveral experiments, the reſult of which he gives in the following words: "From theſe obſervations we may infer, that coffee is ſlightly aſtringent, and antiſeptic; that it moderates alimentary fermentation, and is powerfully ſedative. Its action on the nervous ſyſtem probably depends on the oil it contains; which receives its flavour, and is rendered mildly empyreumatic, by the proceſs of roaſting. Neumann obtained by diſtillation from one pound of coffee, five ounces five drams and a half of water, ſix ounces and half a dram of thick fetid oil, and four ounces and two drams of a caput mortuum. And it is well known, that rye, torrefied with a few almonds, which furniſh the neceſſary proportion of oil, is now frequently employed as a ſubſtitute for theſe berries.

"The medicinal qualities of coffee ſeem to be derived from the grateful ſenſation which it produces in the ſtomach, and from the ſedative powers it exerts on the *vis vitæ*. Hence it aſſiſts digeſtion, and relieves the head-ach; and is taken in large quantities, with peculiar propriety, by the Turks and Arabians; becauſe it counteracts the narcotic effects of opium, to the uſe of which thoſe nations are much addicted.

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"In delicate habits, it often occaſions watchfulneſs, tremors, and many of thoſe complaints which are denominated nervous. It has been even ſuſpected of producing palſies; and, from my own obſervation, I ſhould apprehend not entirely without foundation. Slare affirms, that he became paralytic by the too liberal uſe of coffee, and that his diſorder was removed by abſtinence from that liquor.

"The following curious and important obſervation is extracted from a letter with which I was honoured by Sir John Pringle, in April 1773: 'On reading your ſection concerning coffee, one quality occurred to me which I had obſerved of that liquor, confirming what you have ſaid of its ſedative virtues. It is the beſt abater of the paroxyſm of the periodic aſthma that I have ſeen. The coffee ought to be of the beſt Mocco, newly burnt, and made very ſtrong immediately after grinding it. I have commonly ordered an ounce for one diſh; which is to be repeated freſh after the interval of a quarter or half an hour; and which I direct to be taken without milk or ſugar. The medicine in general is mentioned by Muſgrave, in his treatiſe *De Arthritide anomala;* but I firſt heard of it from a phyſician in this place, who, having once practiſed in Litchfield, had been informed by the old people of that place, that Sir John Floyer, during the latter years of his life, kept free from, or at leaſt lived eaſy under, his aſthma, from the uſe of very ſtrong coffee. This diſcovery, it ſeems, he made after the publication of his book upon that diſeaſe.' Since the receipt of that letter, I have frequently directed coffee in the aſthma with great ſucceſs."

FORBIDDEN-FRUIT TREE. Citrus Medica.

THE forbidden-fruit tree, in trunk, leaves, and flowers, very much reſembles the common orange-tree; but the fruit, when ripe, is larger and longer than the biggeſt orange. It has ſomewhat the taſte of a ſhaddock; but far exceeds that, as well as the beſt orange, in its delicious taſte and flavour. They are elegant ever-greens, riſing in this country from about five to ten feet in height; forming full and handſome heads, cloſely garniſhed with beautiful large leaves all the year round, and putting forth a profuſion of ſweet flowers in ſpring and early in ſummer; which even in this climate are often ſucceeded by abundance of fruit that ſometimes arrive at tolerable perfection. Though all the varieties were originally obtained by ſeed, yet the only certain method of continuing the approved varieties is by budding or inarching them on ſtocks raiſed from ſeed to a proper ſize. As the young trees, however, are brought in plenty from abroad, this method is never practiſed in this country: but, for curioſity, it may be done by thoſe who are ſo inclined, in the following manner: Early in the ſpring procure ſome kernels, which may be had in plenty from rotten fruits, or others that are properly ripened. Sow the kernels in

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Citrus or Forbidden Fruit Tree.

Pass Sculp

March, in pots of rich light earth half an inch deep, and plunge them in a hot-bed, under frames and glaſſes. Dung or tan may be uſed, but the latter is preferable, giving air, and frequent ſprinklings of water. In two or three weeks, the plants will come up; and, in ſix or eight weeks more, they will be advanced four or five inches or more in height. You muſt now give them more air and water; and about the middle of June harden them to the full air, in which let them remain till October; then move them into the green-houſe, to ſtand till the ſpring; and in March or April plant them ſingly in ſmall pots, being careful to ſhake them out of the ſeed-pots with their roots entire. They muſt be watered immediately after planting, and the watering muſt be occaſionally repeated. After this they are to be treated as woody exotics of the green-houſe; and in a year or two the largeſt of thoſe deſigned for ſtocks will be fit for budding.

The operation for budding is performed in the month of Auguſt, and is done in the common way; only the buds muſt be taken from trees of a good kind that bear well. As ſoon as the operation is finiſhed, the pots with their plants muſt be placed in the green-houſe, or in a glaſs-caſe; or, where there is the convenience of a ſpare bark-pit, where the heat of the bark is almoſt exhauſted, the pots may be plunged therein for two or three weeks. In either caſe, however, the air muſt be admitted freely by opening the front glaſſes; allowing alſo a ſlight ſhade of mats in the middle of hot ſunſhine days, and ſupplying them with water every two or three days during this kind of weather. In three or four weeks the buds will be united with the ſtock; when it will be proper to looſen the bandages, that they may have room to ſwell; the buds, however, will all remain dormant till the next ſpring. They may alſo be propagated by inarching, which is done in the common way; but the method of budding is found to produce much handſomer trees, and therefore is to be preferred. But the moſt cheap and expeditious method of procuring a collection of theſe kinds of trees, is by having recourſe to ſuch as are imported from Spain, Italy, and Portugal. Theſe come over in cheſts, without any earth to their roots, having their roots and heads a little trimmed: they are commonly from one inch to two or three in diameter in the ſtem; from two to four or five feet in height: and by the aſſiſtance of a bark-bed, they readily take root and grow freely, forming as good trees in two years as could be raiſed here by inarching or budding in fifteen or twenty. They are ſold in the Italian warehouſes in London. Their price is from three ſhillings to a guinea each, according to their ſize; and they are generally advertiſed as ſoon as they arrive, which is early in the ſpring, and the ſooner the better. In the choice of theſe trees, it muſt be obſerved, that they are commonly budded at ſuch height in the ſtem as to form heads from about two to four or five feet high; and, as they are frequently furniſhed with two buds, one on each ſide of the ſtem,

theſe ſhould be choſen preferably to others; as they will form the moſt regular heads. Preparatory to their planting, they muſt be placed for a day or two in tubs of water to plump their bark and roots; after this they muſt be waſhed and cleaned, their branches trimmed to half a foot long, and the roots freed from diſeaſed parts, and all the ſmall dried fibres. Then they are to be planted in pots filled with light rich earth; and plunged in a tan-bed, where they are to remain for three or four months; after which they are to be trained to the open air, but will not bear it longer than from the end of May till the middle or end of October.

Sometimes theſe trees, inſtead of being kept in pots or tubs, are planted in the full ground; and, where this can be done, it is by far the moſt eligible method. Where this is intended, there muſt be frames erected for the ſupport of glaſs and other covers, to defend the plants during inclement weather; and in this ſituation the trees generally ſhoot ſtrong, produce large fruit, and may be trained either as wall or ſtandard trees. A ſouth wall, in a dry ſituation, is proper for training them as wall-trees; againſt which may be erected wooden frame-work ſloping, either fixed or moveable, for the ſupport of glaſs frames for winter; likewiſe, for the greater protection of the trees in ſevere froſts, there may be a fire-place with a flue or two carried along a low wall in the fronts and ends. To have the trees as ſtandards, a more capacious and lofty glaſs-caſe ſhould be erected againſt the wall, in the manner of a hot-houſe, but higher; in this one or two rows may be planted, ſuffering them to run up as ſtandards, with only ſome neceſſary pruning juſt to preſerve their regularity. In ſome places there are lofty moveable glaſs-caſes, ſo that two or three rows of trees are planted in a conſpicuous part of the pleaſure-ground. In winter the frame is put over them, and in ſummer wholly taken away. The flowering and fruit-ſetting ſeaſon of all the ſorts of citrus is in June and July. They are often greatly loaded with bloſſoms; and, when theſe ſtand very thick, it is proper to thin them a little, taking off the ſmalleſt. It is alſo to be obſerved, that, as the trees continue blowing and ſetting their fruit for three months, when a full crop of fruit is ſet, it is of benefit to the trees and fruit to gather off the ſuperabundant bloſſoms as they are produced, though ſome permit them to remain on account of their appearance.

GARCINIA, or MANGOSTAN.

THE Garcinia is a genus of the monogynia order, belonging to the dodecandria claſs, of plants; and in the natural method ranking under the 18th order, bicornes. The calyx is tetraphyllous inferior; there are four petals; the berries are octoſpermous, and crowned with a ſhield-like ſtigma. The mangoſtana, which is the principal

cipal ſpecies, is a tree of great elegance, and producing the moſt pleaſant fruit of any yet known.

This tree has been very accurately deſcribed by Dr. Garcin, in honour of whom, as its moſt accurate deſcriber, Linnæus gave it the name Garcinia in the 35th volume of the Philoſophical Tranſactions. It grows, he informs us, ſeventeen or eighteen feet high, "with a ſtraight taper ſtem like a fir," having a regular tuft in form of an oblong cone, compoſed of many branches and twigs, ſpreading out equally on all ſides, without leaving any hollow. Its leaves, he obſerves, are oblong, pointed at both ends, entire, ſmooth, of a ſhining green on the upper-ſide, and of an olive on the back. Its flower is compoſed of four petals, almoſt round, or a little pointed: their colour reſembles that of a roſe, only deeper and leſs lively. The calyx of this flower is of one piece, expanded, and cut into four lobes. The two upper lobes are ſomething larger than the lower ones; they are greeniſh on the outſide, and of a fine deep red within: the red of the upper ones is more lively than that of the lower ones. This calyx incloſes all the parts of the flower; it is ſupported by a pedicle, which is green, and conſtantly comes out of the end of a twig above the laſt pair of leaves. The fruit is round, of the ſize of a ſmall orange, from an inch and a half to two inches in diameter. The body of this fruit is a capſule of one cavity, compoſed of a thick rind a little like that of a pomegranate, but ſofter, thicker, and fuller of juice. Its thickneſs is commonly a quarter of an inch. Its outer colour is of a dark-brown purple, mixed with a little grey and dark-green. The inſide of the peel is of a roſe colour, and its juice is purple. Laſt of all, this ſkin is of a ſtyptic or aſtringent taſte, like that of a pomegranate, nor does it ſtick to the fruit it contains. The inſide of this fruit is a furrowed globe, divided into ſegments, much like thoſe of an orange, but unequal in ſize, which do not adhere to each other. The number of theſe ſegments is always equal to that of the rays of the top which covers the fruit. The fewer there are of theſe ſegments, the bigger they are. There are often in the ſame fruit ſegments as big again as any of thoſe that are on the ſide of them. Theſe ſegments are white, a little tranſparent, fleſhy, membranous, full of juice like cherries or raſpberries, of a taſte of ſtrawberries and grapes together. Each of the ſegments incloſes a ſeed of the figure and ſize of an almond ſtripped of its ſhell, having a protuberance on one of its ſides. Theſe ſeeds are covered with two ſmall ſkins, the outermoſt of which ſerves for a baſis to the filaments and membranes of which the pulp is compoſed. The ſubſtance of theſe ſeeds comes very near to that of cheſnuts, as to their conſiſtency, colour, and aſtringent quality.

"This tree (according to our author) originally grows in the Molucca iſlands, where it is called mangoſtan; but has been tranſplanted from thence to the iſlands of

of Java and Malacca, at which laſt place it thrives very well. Its tuft is ſo fine, ſo regular, ſo equal, and the appearance of its leaves ſo beautiful, that it is at preſent looked upon at Batavia as the moſt proper for adorning a garden, and affording an agreeable ſhade. There are few ſeeds, however, (he obſerves,) to be met with in this fruit that are good for planting, moſt part of them being abortive."—He concludes his deſcription by mentioning, that one may eat a great deal of this fruit without any inconvenience; and that it is the only one which ſick people may be allowed to eat without any ſcruple.

Other writers concur in their praiſes of this fruit. Rumphius obſerves, that the mangoſtan is univerſally acknowledged to be the beſt and wholeſomeſt fruit that grows in India; that its fleſh is juicy, white, almoſt tranſparent, and of as delicate and agreeable a flavour as the richeſt grapes; the taſte and ſmell being ſo grateful, that it is ſcarcely poſſible to be cloyed with eating it.—He adds, that, when ſick people have no reliſh for any other food, they generally eat this with great delight; but, ſhould they refuſe it, their recovery is no longer expected. "It is remarkable (ſays he) that the mangoſtan is given with ſafety in almoſt every diſorder. The dried bark is uſed with ſucceſs in the dyſentery and teneſmus; and an infuſion of it is eſteemed a good gargle for a ſore mouth or ulcers in the throat. The Chineſe dyers uſe this bark for the ground or baſis of a black colour, in order to fix it the firmer."

According to Captain Cook, in his Voyage round the World, vol. iii. p. 737, the Garcinia mangoſtana of Linnæus is peculiar to the Eaſt-Indies. It is about the ſize of the crab-apple, and of a deep red-wine colour. On the top of it is the figure of five or ſix ſmall triangles joined in a circle; and at the bottom ſeveral hollow green leaves, which are remains of the bloſſom. When they are to be eaten, the ſkin, or rather fleſh, muſt be taken off; under which are found ſix or ſeven white kernels, placed in a circular order; and the pulp with which theſe are inveloped is the fruit, than which nothing can be more delicious. It is a happy mixture of the tart and the ſweet, which is no leſs wholeſome than pleaſant; and, as well as the ſweet orange, is allowed in any quantity to thoſe who are afflicted with a fever either of the putrid or inflammatory kind.

MANCHINEEL-TREE. Hippomane.

THIS is a genus of the adelphia order, belonging to the monœcia claſs, of plants; and in the natural method ranking under the 38th order, tricoccæ. The male has an amentum and bifid perianthium, without any corolla; the female perianthium is trifid; there is no corolla: the ſtigma is tripartite; and the plum or capſule tricoccous.

Species. 1. The mancinella with oval ſawed leaves is a native of all the Weſt-India iſlands. It has a ſmooth browniſh bark; the trunk divides upwards into ma-

Dodd delin. *The Manchineel Tree.* Pass Sculp.

ny branches, garniſhed with oblong leaves about three inches long. The flowers come out in ſhort ſpikes at the end of the branches, but make no great appearance, and are ſucceeded by fruit of the ſame ſhape and ſize with a golden pippin. The tree grows to the ſize of a large oak. 2. The biglanduloſa, with oblong bay leaves, is a native of South America; and grows to as large a ſize as the firſt, from which it differs moſtly in the ſhape of its leaves. 3. The ſpinoſa, with holly-leaves, is a native of Campeachy, and ſeldom riſes above twenty feet high; the leaves greatly reſemble thoſe of the common holly, and are ſet with ſharp prickles at the end of each indenture. They are of a lucid green, and continue all the year.

Culture. Theſe plants, being natives of very warm climates, cannot be preſerved in this country without a ſtove; nor can they by any means be made to riſe above five or ſix feet high even with that aſſiſtance. They are propagated by ſeeds; but muſt have very little moiſture, or they will certainly be killed by it.

Properties. Theſe trees have a very poiſonous quality, abounding with an acrid milky juice of a highly cauſtic nature. Strangers are often tempted to eat the fruit of the firſt ſpecies; the conſequences of which are, an inflammation of the mouth and throat, pains in the ſtomach, &c. which are very dangerous, unleſs remedies are ſpeedily applied. The wood is much eſteemed for making cabinets, book-caſes, &c. being very durable, taking a fine poliſh, and not being liable to become worm-eaten: but, as the trees abound with a milky cauſtic juice already mentioned, fires are made round their trunks to burn out this juice; otherwiſe thoſe who fell the trees would be in danger of loſing their ſight by the juice flying in their eyes. This juice raiſes bliſters on the ſkin wherever it falls, turns linen black, and makes it fall out in holes. It is alſo dangerous to work the wood after it is ſawn out; for, if any of the ſaw-duſt happens to get into the eyes of the workmen, it cauſes inflammations and the loſs of ſight for ſome time; to prevent which, they generally cover their faces with fine lawn during the time of working the wood. It is with the juice of this tree that the Indians uſed to poiſon their arrows.

MARSH-MALLOW OF SURINAM. ALTHÆA.

THIS plant is called at Surinam *okkerum*, and is an elegant ſpecies of the marſh-mallow, ſo well known to botaniſts. It grows about ſix feet high, and bears double flowers, ſome of which are yellow and white, and others red.—If the fruit be cut, a milky liquor drops out, clammy and in the form of threads; which they boil and make a drink of in America, being famous for internal bruiſes, and for moſt diſeaſes of the ſtomach and bowels.

Beſides this, there are three other ſpecies of the marſh-mallow, which I ſhall here deſcribe. 1. The officinalis, or common marſh-mallow, is a native of Britain, and

has a perennial root, and an annual ſtalk, which periſhes every autumn. The ſtalks grow erect to the height of four or five feet. Theſe are garniſhed with leaves, which are hoary, ſoft to the touch, and placed alternately on the branches. The flowers come out from under the wings of the leaves, like the mallow, and are of a purpliſh white. 2. The hirſuta, or hairy marſh-mallow, is a native of Spain and Portugal. It is a low plant, whoſe branches trail on the ground, unleſs they are ſupported by ſtakes. The leaves and ſtalks are beſet with ſtrong hairs; the flowers come out like thoſe of the common ſort, but are ſmaller, and have purpliſh bottoms. 3. The cannabina, or ſhrubby marſh-mallow, is a native of Hungary and Iſtria. It has a woody ſtem, which riſes to the height of four or five feet: and puts out many ſide-branches. The flowers come out in the ſame manner as in the others, but are of a deeper red colour. This ſort ſeldom flowers the firſt year, unleſs the ſummer proves warm: but when the plants live through the winter, they will flower early in the following ſummer, and produce good ſeeds.

Culture. Though the officinalis is found naturally in ſalt marſhes, it will thrive when tranſplanted into any ſoil, or in any ſituation; however, it will always grow larger in a moiſt than in a dry ſoil. It may be propagated either by parting the roots in autumn when the ſtalks decay, or by ſowing the ſeeds in the ſpring. If the ſeeds of the ſecond ſpecies are ſown in April, the plants will flower in July, and carry ripe ſeed in September. They ought to be ſown in the places where they are to remain, as the roots ſhoot deep in the ground: ſo that, unleſs the plants are removed very young, they ſeldom ſurvive it. The ſeeds of the cannabina ought alſo to be ſown where the plants are to remain, for the reaſon juſt now given. They ſhould have a ſheltered ſituation and a dry ſoil, otherwiſe they will not live through the winter. Indeed they ſeldom continue in this country above two years, with all the care that can be taken of them.

Medicinal Uſes. The officinalis is the only ſpecies uſed in medicine. The whole plant, eſpecially the root, abounds with a mild mucilage. It has the general virtues of an emollient medicine; and proves ſerviceable in a thin acrimonious ſtate of the juices, and where the natural mucus of the inteſtines is abraded. It is chiefly recommended in ſharp defluxions upon the lungs, hoarſeneſs, dyſenteries; and likewiſe in nephritic and calculous complaints; not, as ſome have ſuppoſed, that this medicine has any peculiar power of diſſolving or expelling the calculus; but as, by lubricating and relaxing the veſſels, it procures a more free and eaſy paſſage. The root is ſometimes employed externally for ſoftening and maturing hard tumours; chewed, it is ſaid to give eaſe in difficult dentition of children.

This root gave name to an officinal ſyrup, decoction, and ointment; and was likewiſe an ingredient in the compound powder of gum tragacanth and the oil and plaſter of mucilages. But of all theſe formulæ the ſyrup alone is now retained.

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J. Ihle, delin.t J. Pass, sculp.

The Surinam Marsh Mallows.

MANDRAKE. Atropa.

THE fruit of this plant has been much recommended in caſes of barrenneſs. Its freſh root is a violent purge, the doſe being from ten grains to twenty in ſubſtance, and from half a dram to a dram in infuſion. It has been found to do ſervice in hyſteric complaints; but muſt be uſed with great caution, otherwiſe it will bring on convulſions, and many other miſchievous ſymptoms. It has alſo a narcotic quality. At preſent only the freſh leaves are ſometimes uſed in anodyne and emollient cataplaſms and fomentations. It uſed to be an ingredient in one of the old officinal unguents; but both that and the plant itſelf are now rejected from our pharmacopœias. It ſtill however retains a place in the foreign ones, and may perhaps be conſidered as deſerving farther attention.

Naturaliſts tell ſtrange ſtories of this plant: but, ſetting aſide its ſoporiferous virtue, the modern botaniſts will ſcarcely warrant any of them, nor even that human figure ordinarily aſcribed to its roots, eſpecially ſince the diſcovery of the artifice of charlatans in faſhioning it, to ſurpriſe the credulity of the people. The figure given in the annexed plate, fig. 1. however, was taken from a genuine root.

Moſes informs us (Gen. xxx. 14.) that Reuben, the ſon of Leah, being in the field, happened to find mandrakes, which he brought home to his mother. Rachael had a mind to them, and obtained them from Leah, upon condition that ſhe ſhould conſent that Jacob ſhould be Leah's bedfellow the night following. The term *dudaim*, here made uſe of by Moſes, is one of thoſe words of which the Jews at this day do not underſtand the true ſignification. Some tranſlate it violets, others lilies, or jeſſamine. Junius calls it agreeable flowers; Codurquus makes it truffle, or muſhroom; and Calmet will have it to be the citron. Thoſe that would ſupport the tranſlation of mandrakes plead, that Rachael being barren, and having a great deſire to conceive, coveted Leah's mandrakes, it may be preſumed, with a view to its prolific virtues. The ancients have given to mandrakes the name of the apples of love, and to Venus the name of Mandragoritis; and the Emperor Julian, in his epiſtle to Calixenes, ſays, that he drinks the juice of mandrakes to excite amorous inclinations.

MIMOSA, or SENSITIVE PLANT,

IS a genus of the polygamia order, belonging to the monœcia claſs, of plants; and in the natural method ranking under the thirty-third order, lomentaceæ. The hermaphrodite cylyx is quinquedentate; the corolla quinquefid; there are five or more ſtamina, one piſtil, and a legume: the male calyx is quinquedentate; the corolla quinquefid; with five, ten, or more, ſtamina. The name mimoſa ſignifies "mimic;"

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and is given to this genus on account of the ſenſibility of the leaves, which, by their motion, mimic or imitate, as it were, the motion of animals. To this genus Linnæus joins many of the acacias; and it compriſes near 60 different ſpecies, all natives of warm climates. Of the ſorts cultivated here in our ſtoves, &c. ſome are of the ſhrub and tree kind, and two or three are herbaceous perennials and annuals. The ſenſitive kinds are exceedingly curious plants in the very ſingular circumſtance of their leaves receding rapidly from the touch, and running up cloſe together; and in ſome ſorts the footſtalks and all are affected, ſo as inſtantly to fall downward as if faſtened by hinges, which laſt are called *humble ſenſitives*. They have all winged leaves, each wing conſiſting of many ſmall pinnæ. In the Syſtema Vegetabilium, this genus, including the Mimoſas properly ſo called, and the Acacias, is divided into ſeveral ſections, diſtinguiſhed by the figure, ſituation, and arrangement, of the leaves; as, ſimple, ſimply-pinnated, bigeminous and tergeminous, conjugate and pinnated, doubly pinnated. The following are the moſt remarkable

Species, with their properties. 1. The *ſenſitiva*, or common ſenſitive humble plant, riſes with an under-ſhrubby prickly ſtem, branching ſix or eight feet high, armed with crooked ſpines; conjugated pinnated leaves, with bijugated lobes or wings, having the inner ones the leaſt, each leaf on a long footſtalk; and at the ſides and ends of the branches many purple flowers in roundiſh heads; ſucceeded by broad flat jointed pods, in radiated cluſters.—This is ſomewhat of the humble ſenſitive kind; the leaves, footſtalks and all, receding from the touch, though not with ſuch facility as in ſome of the following ſorts.

2. The *pudica*, or baſhful humble plant, riſes with an under-ſhrubby declinated prickly ſtem, branching two or three feet around, armed with hairy ſpines; pinnated digitated leaves, each leaf being of five or more long folioles, attached by their baſe to a long footſtalk, and ſpread out above like the fingers of a hand; and at the ſides and ends of the branches roundiſh heads of greeniſh white flowers, ſucceeded by ſmall jointed prickly pods.—This is truly of the humble ſenſitive kind; for by the leaſt touch the leaves inſtantly recede, contract, cloſe, and together with the footſtalk quickly decline downward, as if aſhamed at the approach of the hand.

3. The *pernambucana*, or ſlothful mimoſa, has under-ſhrubby procumbent unarmed ſtems, branching two or three feet round; bipinnated leaves, of three or four pair of ſhort winged foliola; and at the axillas drooping ſpikes of pentandrous flowers, the lower ones caſtrated.—This ſpecies recedes very ſlowly from the touch, only contracting its pinnæ a little when ſmartly touched; hence the name *ſlothful mimoſa*.

4. The *aſperata*, or Panama ſenſitive-plant. Of this curious ſpecies, which has been well deſcribed by Dr. Browne (but not figured), there is a good figure in the

Reliquiæ Houſtonianæ, publiſhed by Sir Joſeph Banks. It grows in moiſt places, and by the ſides of rivulets, in the pariſhes of St. James and Hanover, Jamaica. It ſeldom riſes above three feet in height; but its ſlender branches extend conſiderably on the neighbouring buſhes. It is armed with crooked ſharp ſpines ſo thickly ſet on the trunk, branches, and leaves, that there is no touching it with ſafety. But the plant has a beautiful appearance; the flowers are yellow and globular, growing at the extremity of the branches. The pods are hairy, brown, and jointed; each containing a ſmall, flat, and brown, ſeed. The leaves are numerous, ſmall, and winged: next to thoſe of the pudica, they are the moſt irritable; contracting with the leaſt touch, and remaining ſo for ſeveral minutes after. This ſpecies would form a good hedge or fence round a garden; and, by being trimmed now and then, may be eaſily kept from ſpreading too much.

5. The *punctata*, or punctated ſenſitive mimoſa, riſes with a ſhrubby upright taper ſpotted unarmed ſtem, branching erectly five or ſix feet high; bipinnated leaves, of four or five pair of long winged folioles, having each about twenty pair of pinnæ; and at the axillas and termination of the branches, oblong ſpikes of yellowiſh decandrous flowers, the inferior ones caſtrated; ſucceeded above by oblong ſeed-pods. This ſort, though naturally ſhrubby and perennial in its native ſoil, yet in this country ſometimes decays in winter. It is only ſenſitive in the foliola, but quick in the motion.

6. The *viva*, lively mimoſa, or ſmalleſt ſenſitive weed, has many creeping roots, and ſpreads itſelf ſo as to cover large ſpots of ground. It riſes at moſt to two inches, has winged leaves, with numerous ſmall pinnæ. The flower is globular, of a blueiſh colour, and grows in cluſters from the axillæ: theſe are followed by little ſhort hairy pods, containing ſmooth ſhining ſeeds. This is the moſt ſenſible of all the mimoſas, the pudica not excepted. By running a ſtick over the plant, a perſon may write his name, and it will remain viſible for ten minutes.

7. The *quadrivalvis*, perennial or quadrivalve humble mimoſa, has herbaceous ſlender quadrangular prickly ſtems, branching and ſpreading all around, armed with recurved ſpines; bipinnated leaves of two or three pair of winged lobes, having each many pinnæ; and at the axillas globular heads of purple flowers, ſucceeded by quadrivalvular pods. This is of the humble ſenſitive kind, both leaves and footſtalks receding from the touch.

8. The *plena*, annual or double-flowered ſenſitive mimoſa, riſes with an herbaceous erect round unarmed ſtem, cloſely branching and ſpreading every way, three or four feet high; bipinnated leaves of four or five pair of winged lobes, of many pairs of pinnæ; and at the axillas and termination of the branches ſpikes of yellow

pentandrous flowers, the lower ones double; ſucceeded by ſhort broad pods. This annual is only ſenſitive in the foliola, but extremely ſenſible of the touch or air.

9. The *cornigera,* or horned Mexican mimoſa, commonly called great horned acacia, has a ſhrubby upright deformed ſtem, branching irregularly, armed with very large horn-like white ſpines, by pairs, connated at the baſe; bipinnated leaves thinly placed; and flowers growing in ſpikes. This ſpecies is eſteemed a curioſity for the oddity of its large ſpines, reſembling the horns of animals, and which are often varioufly wreathed, twiſted, and contorted.

10. The *farneſiana,* or fragrant acacia, grows in woodlands and waſte lands in moſt parts of Jamaica; riſing to twenty-five or thirty feet, with ſuitable thickneſs. The bark of the trunk is brown and ſcaly, the branches are alternate. It is adorned with bipinnated leaves of a bright-green colour; and yellow globular flowers from the axillæ, of a fragrant ſmell. The pods are about three inches long, and half an inch broad: they are of a light-brown colour, ſmooth, compreſſed, and contain five or ſix ſmooth flat ſeeds. Formerly the flowers of this tree were uſed as an ingredient in the *theriaca andromachi* of the old diſpenſatories. The tree is ſometimes planted for a hedge or fence round incloſures; and the timber, though ſmall, is uſeful in rural economy.

11. The *arborea,* or wild tamarind-tree, is common in all the woodlands, and eſpecially near where ſettlements have been made in Jamaica. It riſes to a conſiderable height, and is proportionally thick. The timber is excellent, and ſerves many purpoſes in rural economy: it is of the colour of cedar, pretty hard, and takes a good poliſh. The leaves are numerous; the flowers globular and white. The pods are about a foot in length, of a fine ſcarlet colour; when they are ripe they open and become twiſted. The ſeeds then appear; they are oblong, ſmooth, of a ſhining black, and quite ſoft. On the whole, from the leaves, flowers, and pods, this tree exhibits a ſingular and beautiful contraſt. With us this plant is raiſed in hot-houſes; but it appears, that with a little pains it may be made to grow in the open air. A good ſizeable tree of this ſort grew in the garden of the late Dr. William Pitcairn, at Iſlington.

12. The *latifolia,* ſhag-bark, or white wild tamarind. This excellent timber-tree is very common in Jamaica, and riſes to a moderate height and good thickneſs. The trunk is rough and ſcaly: the leaves are numerous, of a rhomboidal figure, and yellowiſh caſt. The flower-ſpikes are from the axillæ; their colour is yellow. The ſeed-veſſels are flat, jointed, and twiſted. The ſeeds are of the bigneſs of a vetch, white, and finely ſtreaked with blue. Of this tree there is a variety which ſome botaniſts call *ſerpentina.* The chief difference is in the leaves, which are ſmaller, and of a ſhining dark green.

13. The *lebeek*, or ebony-tree. This is a native of the Eaſt-Indies, but raiſed from ſeeds in Jamaica and St. Vincent's. It is figured, though not accurately, by Pluckenet, tab. 331. fig. 1. To what height this tree grows, we cannot yet ſay; but it muſt be of a conſiderable thickneſs, if it be the ebony we have in uſe here. Time will ſoon determine this, as the few plants in the iſlands are reared with great care by Dr. Dancer, in Jamaica, and Mr. Alexander Anderſon in St. Vincent's.

14, 15. The *cinerea* and *pinnata*, caſhew-buſhes. Theſe ſpecies are common about Kingſton and Spaniſh-Town, Jamaica, and riſe by ſlender trunks to about twenty feet. See the Plate, fig. 2.

Dr. Roxburgh of Madras, amongſt a number of uſeful diſcoveries, has found the lac-inſect on this ſpecies of mimoſa. We have ſeen the native gum-lac on one of the ſmall twigs, and a ſpecimen of the plant in the collection of a gentleman. The plant is a variety of the *cinerea*, and appears rather to be the *pinnata*, Linn. It is to be hoped, that in a ſhort time the uſeful inſect juſt mentioned may be tranſported from Aſia to the Weſt-Indies, where this gum, or rather wax, may be alſo produced.

16. The *ſcandens*, or climbing mimoſa; (*Gigalobium ſcandens*, Browne's Jam. p. 362. *Phaſeolus maximus perennis*, Sloane's Jam. 68. *Perim Kaku-valli*, Rheede's Mal. viii. t. 32, 3, 4.) This ſpecies of mimoſa is frequent in all the upland valleys and woodlands on the north ſide of Jamaica. It climbs up the talleſt trees, and ſpreads itſelf in every direction by means of its *cirrhi*, or claſpers, ſo as to form a complete arbour, and to cover the ſpace of an Engliſh acre from one root. This circumſtance has a bad effect on the trees or buſhes ſo ſhaded. Light, air, and rain, (ſo neceſſary for all plants,) being ſhut out, the leaves drop off, the tree gradually rots, and the limbs fall down by the weight of this paraſite.

The roots of this plant run ſuperficially under the ground or herbage. The trunk is ſeldom thicker than a man's thigh, and ſends off many branches, with numerous ſhining green leaves, each of which terminates in a tendril or claſper, that ſerves to faſten it to trees or buſhes. The flower-ſpikes are from the axillæ: they are ſlender, and the florets on them ſmall and numerous. The pod is perhaps the largeſt and longeſt of any in the world; being ſometimes eight or nine feet in length, five inches broad, jointed, and containing ten or fifteen ſeeds. Theſe ſeeds are brown, ſhining, flattened, and very hard, and called *cacoons*. They are the ſame mentioned in the Phil. Tranſ. N° 222, p. 298, by Sir Hans Sloane, as being thrown aſhore on the Hebrides and Orkneys. This happens in the following manner: The ſeeds, or beans, fall into the rivers, and are conveyed to the ſea; the trade-winds carry them weſtward till they fall into the gulf-ſtream, which forces them northward along the coaſt of America and Bahama-iſlands; as the winds blow frequent and ſtrong from America, theſe ſeeds are driven to the eaſtward, till at length they are thrown

thrown aſhore, and left by the tide, as aforeſaid. This bean, after being long ſoaked in water, is boiled and eaten by ſome negroes; but, in general, there ſeems to be no other uſe made of it than as a ſort of ſnuff-box.

17. The *catechu*, according to Mr. Ker, grows only to twelve feet in height, and to one foot in diameter; it is covered with a thick rough brown bark, and towards the top divides into many cloſe branches: the leaves are bipinnated, or doubly winged, and are placed alternately upon the younger branches: the partial pinnæ are nearly two inches long, and are commonly from fifteen to thirty pair, having ſmall glands inſerted between the pinnæ: each wing is uſually furniſhed with about forty pair of pinnulæ or linear lobes, beſet with ſhort hairs: the ſpines are ſhort, recurved, and placed in pairs at the baſe of each leaf: the flowers are hermaphrodite and male, and ſtand in cloſe ſpikes, which ariſe from the axillæ of the leaves, and are four or five inches long: the calyx is tubular, hairy, and divides at the limb into five oval pointed ſegments: the corolla is monopetalous, whitiſh, and of the ſame form as the calyx, but twice its length: the filaments are numerous, capillary, double the length of the corolla, adhering at the baſe of the germen, and crowned with roundiſh antheræ: the germen is oval, and ſupports a ſlender ſtyle, which is of the length of the filaments, and terminated by a ſimple ſtigma: the fruit, or pod, is lance-ſhaped, brown, ſmooth, compreſſed, with an undulated thin margin; it contains ſix or eight roundiſh flattened ſeeds, which produce a nauſeous odour when chewed. From this tree, which grows plentifully on the mountainous parts of Hindooſtan, where it flowers in June, is produced the officinal drug long known in Europe by the name of *terra japonica*.

18. The *Nilotica*, or true Egyptian acacia, riſes to a greater height than the preceding: the bark of the trunk is ſmooth, and of a grey colour; that of the branches has commonly a purpliſh tinge: the leaves are bipinnated, and placed alternately; the partial pinnæ are oppoſite, furniſhed with a ſmall gland between the outermoſt pair, and beſet with numerous pairs of narrow elliptical pinnulæ, or leafits; the ſpines are long, white, ſpreading, and proceed from each ſide of the baſe of the leaves: the flowers are hermaphrodite and male; they aſſume a globular ſhape, and ſtand four or five together upon ſlender peduncles, which ariſe from the axillæ of the leaves: the calyx is ſmall, bell-ſhaped, and divided at the mouth into five minute teeth: the corolla conſiſts of five narrow yellowiſh ſegments: the filaments are numerous, capillary, and furniſhed with roundiſh yellow antheræ; the germen is conical, and ſupports a ſlender ſtyle, crowned with a ſimple ſtigma: the fruit is a long pod, reſembling that of the lupin, and contains many flattiſh brown ſeeds. It is a native of Arabia and Egypt, and flowers in July.

Although

Although the Mimoſa Nilotica grows in great abundance over the vaſt extent of Africa, yet gum arabic is produced chiefly by thoſe trees which are ſituated near the equatorial regions; and we are told that in Lower Egypt the ſolar heat is never ſufficiently intenſe for this purpoſe. The gum exſudes in a liquid ſtate from the bark of the trunk and branches of the tree, in a ſimilar manner to the gum which is often produced upon the cherry-trees, &c. in this country; and by expoſure to the air it ſoon acquires ſolidity and hardneſs. In Senegal the gum begins to flow when the tree firſt opens its flowers; and continues during the rainy ſeaſon till the month of December, when it is collected for the firſt time. Another collection of the gum is made in the month of March, from inciſions in the bark, which the extreme dryneſs of the air at that time is ſaid to render neceſſary. Gum arabic is now uſually imported into England from Barbary; not packed up in ſkins, which was the practice in Egypt and Arabia, but in large caſks, or hogſheads. The common appearance of this gum is well known: and the various figures which it aſſumes ſeem to depend upon a variety of accidental circumſtances attending its tranſudation and concretion. Gum arabic of a pale yellowiſh colour is moſt eſteemed; on the contrary, thoſe pieces which are large, rough, of a roundiſh figure, and of a browniſh or reddiſh hue, are found to be leſs pure, and are ſaid to be produced from a different ſpecies of mimoſa, *(M. Senegal;)* but the Arabian and Egyptian gum is commonly intermixed with pieces of this kind, ſimilar to that which comes from the coaſt of Africa near the river Senegal.

Gum arabic does not admit of ſolution by ſpirit or oil; but in twice its quantity of water it diſſolves into a mucilaginous fluid, of the conſiſtence of a thick ſyrup; and in this ſtate anſwers many uſeful purpoſes, by rendering oily, reſinous, and pinguious, ſubſtances, miſcible with water. The glutinous quality of gum arabic occaſions it to be preferred to moſt other gums and mucilaginous ſubſtances, as a demulcent in coughs, hoarſeneſſes, and other catarrhal affections, in order to obtund irriting acrimonious humours, and to ſupply the loſs of abraded mucus. It has been very generally employed in caſes of ardor urinæ and ſtrangury; but it is the opinion of Dr. Cullen, "that even this mucilage, as an internal demulcent, can be of no ſervice beyond the alimentary canal."

19. The *Senegal* is a native of Guinea, and was ſome time ago introduced into Jamaica. Dr Wright tells us, he ſaw both this and the *Nilotica*, of the ſize of a cherry-tree, growing at Dr. Paterſon's, in the pariſh of Hanover, Jamaica. The flowers are globular and fragrant. The pods are brown, and of the ſize of a gooſequill. The tree, on being wounded, exſudes gum arabic, though in leſs quantity, and leſs tranſparent, than that of the ſhops, which is obtained from the *Nilotica* above deſcribed. There are above ſixty other ſpecies.

On the annexed Plate, at fig. 3. is delineated a non-deſcript ſpecies of an uncommon ſize, mentioned by Mr. Paterſon in his Travels among the Hottentots, but not particularly deſcribed. Like ſeveral other Mimoſas, it produces gum, which is conſidered by the natives as a peculiarly delicate ſpecies of food: the leaves and lower points of the branches ſeem to conſtitute the principal aliment of the camelopardalis; and, from the extent of its boughs, and the ſmoothneſs of the trunk, it affords a ſufficient defence to a ſpecies of gregarious bird againſt the tribe of ſerpents and other reptiles which would otherwiſe deſtroy its eggs. Mr. Bruce deſcribes two plants which ſeem referable to this genus; the one named *ergett el dimmo*, the other *ergett el krone*. The former, in our author's opinion, ſhould be named *Mimoſa ſanguinea*; its name in the Abyſſinian language ſignifying "the bloody ergett," and derived, as he ſuppoſes, from its being partly compoſed of beautiful pink filaments. When the bloſſoms are fully ſpread, the upper part of them conſiſts of yellow curled filaments, and the under part of pink filaments of a ſimilar ſhape. In its unripe ſtate, that part which afterwards becomes pink is of a green colour, and compoſed of tubercles of a larger ſize, and more detached, than thoſe which afterwards produce the yellow filaments; the latter being ſmaller, and cloſer ſet together: the leaves are of the double-pinnated kind.

The name of the other ſpecies, in the Abyſſinian language, ſignifies *the horned ergett;* which our author ſuppoſes to be given it on account of the figure of the pods. The flower very much reſembles that of the Acacia vera in ſize and ſhape, excepting that it is attached to the branch by a ſtrong woody ſtalk of conſiderable length, which grows out at the bottom of the branch bearing the leaves, and is ſheltered as in a caſe by the lower part of it. The branches are all covered with ſhort, ſtrong, and ſharp-pointed, thorns, having their points inclined backwards towards the root. The pods are covered with a prickly kind of hair, which eaſily rubs off with the fingers, ſticks to them, and gives a very uneaſy ſenſation. They have thirteen diviſions; in each of which are three hard, round, and ſhining, ſeeds, of a duſky brown colour. Both of theſe ſhrubs ſhut their leaves on the coming on of the violent rains in the wet ſeaſon, and never fully expand them till the dry ſeaſon returns.

MYRISTICA, or NUTMEG-TREE.

THE Myriſtica, or nutmeg-tree, is a genus of plants belonging to the claſs diœcia, order triandria, and of the natural order of lauri. The male calyx is monophyllous, ſtrong, and parted into three lacinii of an oval ſhape; in the middle of the receptacle riſes a column of the height of the calyx, to the upper part of which the

antheræ are attached: they vary in number from three to twelve or thirteen. The female calyx and corolla as in the male, on a diſtinct tree; the germen of an oval ſhape; the ſtyle ſhort, with a bifid ſtigma, the lacinii of which are oval and ſpreading. The fruit is of that ſort called *drupa;* it is fleſhy, roundiſh, ſometimes unilocular, ſometimes bivalved, and burſts when ripe at the ſide. The ſeed is enveloped with a fleſhy and fatty membraneous ſubſtance, which divides into filaments; (this in one of the ſpecies is the *mace* of the ſhops.) The ſeed, or nutmeg, is round or oval ſhaped, unilocular, and contains a ſmall kernel, variegated on the ſurface by the fibres running in the form of a ſcrew.

Species. There are five ſpecies of this genus according to ſome authors; but, ſome of theſe being only varieties, they may be reduced to three, viz.

1. Myriſtica fatua, or wild nutmeg: this grows in Tobago, and riſes to the height of an apple-tree; has oblong, lanceolated, downy, leaves, and hairy fruit: the nutmeg of which is aromatic, but when given inwardly is narcotic, and occaſions drunkenneſs, delirium, and madneſs, for a time.

2. Myriſtica ſebifera, *(Virola ſebifera,* Aublet, page 904. tab. 345.) A tree frequent in Guiana, riſing to forty or even to ſixty feet high; on wounding the trunk of which, a thick acrid red juice runs out. Aublet ſays nothing of the nutmegs being aromatic; he only obſerves, that a yellow fat is obtained from them, which ſerves many œconomical and medical purpoſes, and that the natives make candles of it.

3. The Myriſtica moſchata, or nutmeg, attains the height of thirty feet, producing numerous branches which riſe together in ſtories, and covered with bark which of the trunk is a reddiſh brown, but that of the young branches is of a bright green colour: the leaves are nearly elliptical, pointed, undulated, obliquely nerved, on the upper ſide of a bright green, on the under whitiſh, and ſtand alternately upon footſtalks: the flowers are ſmall, and hang upon ſlender peduncles, proceding from the axillæ of the leaves: they are both male and female upon ſeparate trees. M. Schwartz, who has carefully examined this as well as the two firſt ſpecies, preſerved in ſpirits, places them amongſt the monadelphia.

The nutmeg has been ſuppoſed to be the *comacum* of Theophraſtus, but there ſeems little foundation for this opinion; nor can it with more probability be thought to be the *chryſobalanus* of Galen. Our firſt knowledge of it was evidently derived from the Arabians; by Avicenna it was called *jiauſiban,* or *jauſiband,* which ſignifies "nut of bands." Rumphius both figured and deſcribed this tree; but the figure given by him is ſo imperfect, and the deſcription ſo confuſed, that Linnæus, who gave it the generic name *Myriſtica,* was unable to aſſign its proper characters. Sonnerat's account of the *muſcadier* is ſtill more erroneous; and the younger Linnæus

was

was unfortunately miſled by this author, placing the myriſtica in the claſs polyandria, and deſcribing the corolla as conſiſting of five petals. Thunberg, who examined the flower of the nutmeg, places it in the claſs monoecia; and, according to his description, the male flower has but one filament, ſurrounded at the upper part by the antheræ; and as the filaments are ſhort and ſlender, and the antheræ united, this miſtake might eaſily ariſe. M. De La Marck informs us, that he received ſeveral branches of the myriſtica, both in flower and fruit, from the Iſle of France, where a nutmeg-tree, which was introduced by Monſieur Poivre in 1770, is now very large, and continually producing flowers and fruit. From theſe branches, which were ſent from Monſ. Cere, director of the king's garden in that iſland, Monſ. De La Marck has been enabled to deſcribe and figure this and other ſpecies of the myriſtica with tolerable accuracy; as will appear from the annexed plate, of which the following is an explanation:

Fig. *a.* A ſprig with fructification. The drupe of the natural ſize, and burſting open. Fig. *b.* The full grown fruit cut lengthways. Fig. *c.* Another ſection of the ſame. Fig. *d.* The nutmeg enveloped with its covering, the mace. Fig. *e.* The fatty membrane, or mace, ſpread out. Fig. *f.* The nutmeg of its natural ſize. Fig. *g.* The ſame with its external tegument removed at one end. Fig. *h.* The ſame with its outer tegument entirely removed. Fig. *i.* A tranſverſe ſection of the nutmeg.

The ſeed or kernels, called *nutmegs*, are well known, as they have been long uſed both for culinary and medical purpoſes. Diſtilled with water, they yield a large quantity of eſſential oil, reſembling in flavour the ſpice itſelf; after the diſtillation, an inſipid ſebaceous matter is found ſwimming on the water; the decoction inſpiſſated, gives an extract of an unctuous, very lightly bitteriſh, taſte, and with little or no aſtringency. Rectified ſpirit extracts the whole virtue of nutmegs by infuſion, and elevates very little of it in diſtillation; hence the ſpirituous extract poſſeſſes the flavour of the ſpice in an eminent degree.

Nutmegs, when heated, yield to the preſs a conſiderable quantity of limpid yellow oil, which on cooling concretes into a ſebaceous conſiſtence. In the ſhops we meet with three ſorts of unctuous ſubſtances called *oil of mace*, though really expreſſed from the nutmeg. The beſt is brought from the Eaſt-Indies in ſtone jars; this is of a thick conſiſtence, of the colour of mace, and has an agreeable fragrant ſmell; the ſecond ſort, which is paler coloured, and much inferior in quality, comes from Holland in ſolid maſſes, generally flat, and of a ſquare figure: the third, which is the worſt of all, and uſually called *common oil of mace*, is an artificial compoſition of ſevum, palm-oil, and the like, flavoured with a little genuine oil of nutmeg.

Method

Method of gathering and preparing Nutmeg. When the fruit is ripe, the natives aſcend the trees, and gather it by pulling the branches to them with long hooks. Some are employed in opening them immediately, and in taking off the green ſhell or firſt rind, which is laid together in a heap in the woods, where in time it putrefies. As ſoon as the putrefaction has taken place, there ſprings up a kind of muſhrooms, called *boleti moſchatyni*, of a blackiſh colour, and much valued by the natives, who conſider them as delicate eating. When the nuts are ſtripped of their firſt rind, they are carried home, and the mace is carefully taken off with a ſmall knife. The mace, which is of a beautiful red, but afterwards aſſumes a darkiſh or reddiſh colour, is laid to dry in the ſun for the ſpace of a day, and then removed to a place leſs expoſed to his rays, where it remains for eight days, that it may ſoften a little. They afterwards moiſten it with ſea-water, to prevent it from drying too much, or from loſing its oil. They are careful, however, not to employ too much water, leſt it ſhould become putrid, and be devoured by worms. It is laſt of all put into ſmall bags, and ſqueezed very cloſe.

The nuts, which are ſtill covered with their ligneous ſhell, are for three days expoſed to the ſun, and afterwards dried before a fire till they emit a ſound when they are ſhaken; they then beat them with ſmall ſticks in order to remove their ſhell, which flies off in pieces. Theſe nuts are diſtributed into three parcels: the firſt of which contains the largeſt and moſt beautiful, which are deſtined to be brought to Europe; the ſecond contains ſuch as are reſerved for the uſe of the inhabitants; and the third contains the ſmalleſt, which are irregular or unripe. Theſe are burnt, and part of the reſt is employed for procuring oil by preſſure. A pound of them commonly gives three ounces of oil, which has the conſiſtence of tallow, and has entirely the taſte of nutmeg. Both the nut and mace, when diſtilled, afford an eſſential, tranſparent, and volatile, oil, of an excellent flavour. The nutmegs which have been thus ſelected would ſoon corrupt if they were not watered, or rather pickled with lime-water made from calcined ſhell-fiſh which they dilute with ſalt-water till it attain the conſiſtence of fluid pap. Into this mixture they plunge the nutmegs, contained in ſmall baſkets, two or three times, till they are completely covered over with the liquor. They are afterwards laid in a heap, where they heat, and loſe their ſuperfluous moiſture by evaporation. When they have ſweated ſufficiently, they are then properly prepared, and fit for a ſea-voyage.

In the Iſland of Banda, the fruit of the nutmeg-tree is preſerved entire in the following manner: When it is almoſt ripe, but previous to its opening, it is boiled in water and pierced with a needle. They next lay it in water to ſoak for ten days, till it has loſt its ſour and ſharp taſte. They then boil it gently in a ſyrup of ſugar, to which, if they wiſh it to be hard, a little lime is added. This operation is repeat-

ed for eight days, and each time the ſyrup is renewed. The fruit when thus preſerved is put for the laſt time into a pretty thick ſyrup, and is kept in earthern pots cloſely ſhut. Theſe nuts are likewiſe pickled with brine or with vinegar; and, when they intend to eat them, they firſt ſteep them in freſh water, and afterwards boil them in ſyrup of ſugar, &c.

Uſes. Nutmegs preſerved entire are preſented as deſerts, and the inhabitants of India ſometimes eat them when they drink tea. Some of them uſe nothing but the pulp; others likewiſe chew the mace; but they generally throw away the kernel, which is really the nutmeg. Many, who perform ſea-voyages to the north, chew this fruit every morning. The medicinal qualities of nutmeg are ſuppoſed to be aromatic, anodyne, ſtomachic, and reſtringent; and, with a view to the laſt-mentioned effects, it has been much uſed in diarrhœas and dyſenteries. To many people the aromatic flavour of nutmeg is very agreeable; they however ſhould be cautious not to uſe it in large quantities, as it is apt to affect the head, and even to manifeſt an hypnotic power in ſuch a degree as to prove extremely dangerous. Bontius ſpeaks of this as a frequent occurrence in India; and Dr. Cullen relates a remarkable inſtance of this ſoporific effect of the nutmeg, which fell under his own obſervation, and hence concludes, that in apoplectic and paralytic caſes this ſpice may be very improper. He obſerves, that a perſon by miſtake took two drams or a little more of powdered nutmeg: he felt it warm in his ſtomach, without any uneaſineſs; but in about an hour after he had taken it he was ſeized with a drowſineſs, which gradually increaſed to a complete ſtupor and inſenſibility; and not long after he was found fallen from his chair, lying on the floor of his chamber in the ſtate mentioned. Being put to bed, he fell aſleep; but, awaking a little from time to time, he was quite delirious; and he thus continued alternately ſleeping and delirious for ſeveral hours. By degrees, however, both theſe ſymptoms diminiſhed; ſo that in about ſix hours from the time of taking the nutmeg he was pretty well recovered from both. Although he ſtill complained of head-ach, and ſome drowſineſs, he ſlept naturally and quietly the following night, and next day was quite in his ordinary health. The officinal preparations of nutmeg are a ſpirit and eſſential oil, and the nutmeg in ſubſtance roaſted, to render it more aſtringent. Both the ſpice itſelf and its eſſential oil enter ſeveral compoſitions, as the confectio aromatica, ſpiritus amoniæ com. &c. Mace poſſeſſes qualities ſimilar to thoſe of the nutmeg, but is leſs aſtringent, and its oil is ſuppoſed to be more volatile and acrid.

Remarks on the Trade of Nutmegs. Nutmeg-trees grow in ſeveral iſlands in the Eaſtern Ocean. The wood-pigeon of the Moluccas is unintentionally a great planter of theſe trees, and diſſeminates them in places where a nation, powerful by its commerce, thinks it for its intereſt that they ſhould be rooted out and deſtroyed.

The Dutch, whoſe unwearied patience can ſurmount the greateſt obſtacles, long appropriated to themſelves the crop of nutmegs, as well as that of cloves and cinnamon, growing in the iſlands of Ternate, Ceylon, &c. either by right of conqueſt or by paying ſubſidies to the iſlanders, who find theſe much more profitable than the former produce of their trees. It is nevertheleſs true, that they prevailed upon or compelled the inhabitants of the Moluccas to cut down and root out all the clove-trees, which they preſerve only in the iſlands of Amboyna and Ternate, which are in a great meaſure ſubject to them. We know for certain, that the Dutch paid 18,000 rix-dollars yearly to the King of Ternate, by way of tribute or gift, in order to recompenſe him for the loſs of his clove-trees in the other Molucca iſlands; and that they were moreover bound by treaty to take, at three-pence three-farthings a pound, all the cloves brought by the natives of Amboyna to their magazines. They likewiſe ſucceeded in deſtroying the cinnamon every where except in the iſland of Ceylon. The ſame was the caſe with white pepper, &c. ſo that the trade of the whole of Europe, and of great part of Aſia, in this ſpecies of commodity, long paſſed through their hands.

The Dutch had immenſe and very rich magazines of theſe precious aromatics, both in India and Europe. They had actually by them the produce of ſixteen years, and never ſupplied their neighbours with the laſt, but always with the oldeſt crop: in 1760 they ſold what was laid up in 1744. It is commonly ſaid, that, when the Dutch have too great a quantity of cloves, nutmegs, &c. in their magazines, they throw them into the ſea; but the fact is, that they get rid of their ſuperfluous aromatics by burning them. On the 10th of June, 1760, M. Bomare ſaw at Amſterdam, near the admiralty, a fire, the fuel of which was valued at 8,000,000 of livres; and as much was to be burned the day following. The feet of the ſpectators were bathed in the eſſential oil of theſe ſubſtances; but no perſon was allowed to gather any of it, much leſs to take any of the ſpices which were in the fire. Some years before, upon a ſimilar occaſion, and at the ſame place, a poor man who had taken up ſome nutmegs which had rolled out of the fire, was, as M. Bomare was informed, ſeized and condemned to immediate execution. We will only add, that notwithſtanding the jealouſy of the Dutch, and the pains they take to preſerve the ſale of cloves wholly to themſelves, they have never been able to prevent their own officers in ſeveral parts of India from embezzling and ſelling conſiderable quantities of them. M. de Jaucourt informs us, that, in order to defraud the company, they ſell them to the veſſels of other nations which they meet at ſea, and moiſten the remainder with water, that they may ſtill have the number of quintals of which their cargo conſiſted. The quantity ſold may amount to ten quintals in one hundred before it can be perceived by the clerks of the magazines at Batavia, where they are received.

We

We are informed by M. Romé de Liſle, that the Engliſh draw a great deal of cinnamon, pepper, and cloves, from the iſlands of Sumatra. The ſtaple for this commodity is at the factory of Bencoolen. We have likewiſe ſeen a ſpecimen of pretty good cinnamon raiſed at Martinico. The French, to prevent the exportation of ſpecie for theſe aromatic and exotic productions, have attempted to introduce the culture of them into ſome of their colonies. A great many plants of the clove and nutmeg-tree have been procured, and planted in the Iſle of France, the Iſland of Bourbon, and alſo at Cayenne, where they have a very promiſing appearance.

FLOWERING PAVONIS. Cæsalpinia.

THIS plant grows nine feet in height, and bears moſt beautiful yellow flowers. The ſeed ſteeped in water, and a ſtrong decoction of it given to a woman in labour, greatly facilitates the delivery. For this reaſon, thoſe Indian ſlaves who have conſidered themſelves cruelly uſed by their taſk-maſters in the plantations, take great pains to get at this tree, for the purpoſe of procuring abortion, which they know it never fails to effect. Thoſe negroes who are brought from Guinea and Angola were the firſt who were diſcovered making uſe of this plant; and while they ate of it, or drank a docoction of its leaves or ſeeds, they neither conceived nor brought forth children. On being remonſtrated with, they ſaid they would ſooner die than bring forth children in ſlavery, who, as they grew up, muſt undergo the ſame yoke, and ſuffer all the cruelties inflicted on their unfortunate parents. Tournefort calls this tree *Poinciana flore pulcherrimo*. It grows in all the warm climates, and is found in many parts of America.

PIMENTO, or JAMAICA PEPPER TREE. Myrtus.

THE Jamaica pepper-tree is a ſpecies of the myrtle, a genus of the monogynia order, belonging to the icoſandria claſs, of plants; and in the natural method ranking under the 19th order, heſperideæ. The calyx is quinquefid, ſuperior; there are five petals; the berry is diſpermous or triſpermous. There are twenty-eight ſpecies, of which the moſt remarkable are,

1. The *communis*, or common myrtle-tree, riſeth with a ſhrubby, upright, firm, ſtem, branching numerouſly all around into a cloſe full head, riſing eight or ten feet high, very cloſely garniſhed with oval-lanceolate, entire, moſtly oppoſite, leaves, from half an inch to an inch and a half long, and one broad, on ſhort foot-ſtalks; and numerous, ſmall, pale, flowers from the axillas, ſingly on each foot-ſtalk, having diphyllous involucrums; each flower ſucceeded by a ſmall, oval, dark-purple, berry.

The

Ihle del.t

The Flowering Pavonis.

J. Pass sculp.

Dodd delin. Page Sculp.

1 The Pimento, or Jamaica Pepper Tree. 2 The Jamaica Plantain. 3 The Banana Plantain.

The moſt material varieties are:—Broad-leaved Roman myrtle, with oval, ſhining, green, leaves, an inch and a half long, and one broad; and which is remarkably floriferous. Gold ſtriped broad-leaved Roman myrtle. Broad-leaved Dutch myrtle, with ſpear-ſhaped, ſharp-pointed, dark-green, leaves, an inch long, and about three quarters of one broad. Double-flowered Dutch myrtle. Broad-leaved Jews myrtle, having the leaves placed by threes at each joint; by which particular circumſtance this ſpecies is in univerſal eſtimation among the Jews in their religious ceremonies, particularly in decorating their tabernacles; and for which purpoſe many gardeners about London cultivate it with particular care, to ſell to the above people, who are often obliged to purchaſe it at the rate of ſixpence or a ſhilling for a ſmall branch: for the true ſort, having the leaves exactly by threes, is very ſcarce, and is a curioſity; but by care in its propagation, taking only the perfectly ternate-leaved ſhoots for cuttings, it may be increaſed faſt enough; and is worth the attention of the curious, and particularly thoſe who raiſe myrtles for the London markets. Orange-leaved Spaniſh myrtle, with oval ſpear-ſhaped leaves, an inch and a half long or more, and one broad, in cluſters round the branches, and reſemble the ſhape and colour of orange-tree leaves. Gold-ſtriped leaved orange myrtle. Common upright Italian myrtle, with its branches and leaves growing more erect; the leaves oval, lanceolate-ſhaped, acute-pointed, and near an inch long, and half a one broad. Silver-ſtriped upright Italian myrtle. White-berried upright Italian myrtle. Portugal acute-leaved myrtle, with ſpear-ſhaped, oval, acute-pointed, leaves, about an inch long. Box-leaved myrtle, with weak branches, ſmall, oval, obtuſe, lucid-green, cloſely-placed, leaves. Striped box-leaved myrtle. Roſemary-leaved myrtle, hath erect branches, ſmall, narrow, lanceolate, acute-pointed, ſhining, green, very fragrant, leaves. Silver-ſtriped roſemary-leaved myrtle. Thyme-leaved myrtle, with very ſmall cloſely-placed leaves. Nutmeg-myrtle, with erect branches and leaves; the leaves oval, acute-pointed, and finely ſcented like a nutmeg. Broad-leaved nutmeg-myrtle. Silver-ſtriped leaved ditto. Criſtated or cock's-comb myrtle, frequently called bird's-neſt myrtle, hath narrow ſharp-pointed leaves, criſtated at intervals. Theſe are all beautiful ever-green ſhrubs of exceeding fragrance; exotics originally of the ſouthern parts of Europe, and of Aſia and Africa, and conſequently in this country require the ſhelter of a green-houſe in winter: all of which, though rather of the ſmall-leaved kind, have their foliage cloſely placed, remain all the year, and are very floriferous in ſummer; and, when there is a collection of the different ſorts, they afford an agreeable ſource of variety with each other. They therefore claim univerſal eſteem as principal green-houſe plants, eſpecially as they are all ſo eaſily raiſed from cuttings, and of ſuch eaſy culture, as to be attainable in every garden where there is any ſort of green-houſe, or

garden-frames furniſhed with glaſſes for protecting them in winter from froſt; but ſome of the broad-leaved ſorts are ſo hardy as to ſucceed in the full ground, againſt a ſouth wall and other warm expoſures, all the year, by only allowing them ſhelter of mats occaſionally in ſevere froſty weather; ſo that a few of theſe ſorts may alſo be exhibited in a warm ſituation in the ſhrubbery: obſerving, however, that all the ſorts are principally to be conſidered as green-houſe plants, and a due portion of them muſt always remain in pots to move to that department in winter.

2. The *Myrtus pimenta*, Jamaica pepper, or all-ſpice tree, grows above thirty feet in height, and two in circumference; the branches near the top are much divided and thickly beſet with leaves, which by their continual verdure always give the tree a beautiful appearance; the bark is very ſmooth externally, and of a grey colour; the leaves vary in ſhape and in ſize, but are commonly about four inches long, veined, pointed, elliptical, of a deep ſhining-green colour; the flowers are produced in bunches or panicles, and ſtand upon ſubdividing or trichotomous ſtalks, which uſually terminate the branches; the calyx is cut into four roundiſh ſegments; the petals are alſo four, white, ſmall, reflex, oval, and placed oppoſite to each other between the ſegments of the calyx; the filaments are numerous, longer than the petals, ſpreading, of a greeniſh-white colour, and riſe from the calyx and upper part of the germen; the antheræ are roundiſh, and of a pale-yellow colour; the ſtyle is ſmooth, ſimple, and erect; the ſtigma is obtuſe; the germen becomes a round ſucculent berry, containing two kidney-ſhaped flattiſh ſeeds. This tree (a branch of which is ſhown on the Plate at fig. 1.) is a native of New Spain and the Weſt-India iſlands. In Jamaica it grows very plentifully; and in June, July, and Auguſt, puts forth its flowers, which, with every part of the tree, breathe an aromatic fragrance. The berries when ripe are of a dark-purple colour, and full of a ſweet pulp, which the birds devour greedily, and, muting the ſeeds, afterwards propagate theſe trees in all parts of the woods. It is thought that the ſeeds, paſſing through them in this manner, undergo ſome fermentation, which fits them better for vegetating than thoſe gathered immediately from the tree.

The *pimento* is a moſt beautiful odoriferous ever-green, and exhibits a fine variety in the ſtove at all ſeaſons. It was firſt introduced and cultivated in this country by Mr. Philip Miller in 1739. With reſpect to flowering, all the varieties of the *Myrtus communis* flower here in July and Auguſt, moſt of which are very floriferous: the broad-leaved Roman kind in particular is often covered with flowers, which in ſome of the ſorts are ſucceeded here by berries ripening in winter. The *pimento* alſo flowers in the ſtove with great beauty and luxuriance. The flowers of moſt of the ſorts are ſmall, but numerous; and are all formed each of five oval petals and many ſtamina. As all theſe plants require protection in this country, they muſt be

kept always in pots, for moving to the proper places of ſhelter according to their nature; the *Myrtus communis* and varieties to the green-houſe in winter; the *pimento* and other delicate kinds to the ſtove, to remain all the year. Therefore let all the ſorts be potted in rich light earth; and, as they advance in growth, ſhift them into larger pots, managing the myrtles as other green-houſe ſhrubs, and the ſtove-kind as other woody exotics of the ſtove.

Properties, &c. The leaves and flowers of common upright myrtle have an aſtringent quality, and are uſed for cleanſing the ſkin, fixing the teeth when looſened by the ſcurvy, and ſtrengthening the fibres. From the flowers and young tops is drawn a diſtilled water that is deterſive, aſtringent, coſmetic, and uſed in gargles. A decoction of the flowers and leaves is applied in fomentations. The berries have a binding deterſive quality; and the chemical oil obtained from them is excellent for the hair, and uſed in pomatums and moſt other external beautifiers of the face and ſkin. As an internal medicine, theſe berries have little or no merit.

In the *Dictionnaire portatif d'Hiſtoire Naturelle*, a fact is related, which, if true, tends to ſhow the ſtrongly-aſtringent quality of myrtle. "Myrtle is likewiſe the baſe of a pomatum called *pommade de la comteſſe*, and well known on account of an extraordinary hiſtorical fact. One of thoſe gay youths who flutter about the toilets of the fair happened one day to be left alone in the ſtorehouſe of the graces. With eager curioſity he examined the perfumes, the ſmelling-bottles, the perfumed powder, the eſſences, and the coſmetics. To give more of the vermillion and greater pliancy to his lips, and to remove ſome diſagreeable eruptions, he lightly ſpreads with his indiſcreet finger the fatal pommade, looks at himſelf in the glaſs, and contemplates his beauty with admiration. The lady enters; he wiſhes to ſpeak, but his lips contracted, and he could only ſtammer. The lady looked at him with aſtoniſhment; at length caſting her eyes on the toilet, ſhe diſcovered by the open pot the cauſe of the miſtake, and enjoyed a hearty laugh at the expenſe of her admirer, whoſe confuſion announced his indiſcretion."

Pimento-berries are chiefly imported into Britain from Jamaica; whence the name *Jamaica pepper*. It is alſo called *all-ſpice*, from its taſte and flavour being ſuppoſed to reſemble thoſe of many different ſpices mixed together. It is one of the ſtaple articles of Jamaica, where the pimento-walks are upon a large ſcale, ſome of them covering ſeveral acres of ground. When the berries arrive at their full growth, but before they begin to ripen, they are picked from the branches, and expoſed to the ſun for ſeveral days, till they are ſufficiently dried; this operation is to be conducted with great care, obſerving that on the firſt and ſecond day's expoſure they require to be turned very often, and always to be preſerved from rain and the evening dews. After this proceſs is completed, which is known by the colour and rattling of the ſeeds in the berries, they are put up in bags or hogſheads for the market. This ſpice, which

which was at firſt brought over for dietetic uſes, has been long employed in the ſhops as a ſuccedaneum to the more coſtly oriental aromatics: it is moderately warm, of an agreeable flavour, ſomewhat reſembling that of a mixture of cloves, cinnamon, and nutmegs. Diſtilled with water it yields an elegant eſſential oil, ſo ponderous as to ſink in the water, in taſte moderately pungent, in ſmell and flavour approaching to oil of cloves, or rather a mixture of cloves and nutmegs. To rectified ſpirit it imparts by maceration or digeſtion the whole of its virtue: in diſtillation it gives over very little to this menſtruum, nearly all its active matter remaining concentrated in the inſpiſſated extract. Pimento can ſcarcely be conſidered as a medicine: it is, however, an agreeable aromatic, and on this account is not unfrequently employed with different drugs, requiring ſuch a grateful adjunct. Both the Pharmacopœias direct an aqueous and ſpirituous diſtillation to be made from theſe berries, and the Edinburgh College orders alſo the *oleum eſſentiale piperis Jamaicenſis*.

PLANTAIN-TREE. Musa.

THE plantain-tree is a genus of the monogynia order, belonging to the hexandria claſs, of plants; and in the natural method ranking under the eighth order, ſcitamineæ. The calyx of the male hermaphrodite is a ſpatha, or ſheath; the corolla is dipetalous; the one petal erect and quinquedentate; the other nectariferous, concave, and ſhorter; there are ſix filaments; five of which are perfect; one ſtyle; the germen inferior and abortive. The female hermaphrodite has the calyx, corolla, filaments, and piſtil, of the male hermaphrodite, with only one filament perfect; the berry is oblong, and three-angled below. The moſt remarkable ſpecies are, the *Muſa paradiſaica*, or Jamaica plantain; and the *Muſa ſapientum*, or banana-tree. See the Plate, fig. 2, 3.

The firſt ſort is cultivated in all the iſlands of the Weſt-Indies, where the fruit ſerves the Indians for bread; and ſome of the white people alſo prefer it to moſt other things, eſpecially to the yams and caſſada-bread. The plant riſes with a ſoft ſtalk fifteen or twenty feet high; the lower part of the ſtalk is often as large as a man's thigh, diminiſhing gradually to the top, where the leaves come out on every ſide; theſe are often eight feet long, and from two to three feet broad, with a ſtrong fleſhy mid-rib, and a great number of tranſverſe veins running from the mid-rib to the borders. The leaves are thin and tender, ſo that, where they are expoſed to the open air, they are generally torn by the wind; for, as they are large, the wind has great power againſt them; theſe leaves come out from the centre of the ſtalk, and are rolled up at their firſt appearance; but, when they are advanced above the ſtalks, they expand and turn backward. As theſe leaves come up rolled in the manner before-mentioned, their advance upward is ſo quick, that their growth may almoſt be

be diſcerned by the naked eye; and, if a fine line be drawn acroſs, level with the top of the leaf, in an hour's time the leaf will be near an inch above it. When the plant is grown to its full height, the ſpikes of flowers will appear in the centre, which is often near four feet in length, and nods on one ſide. The flowers come out in bunches; thoſe in the lower part of the ſpike being the largeſt; the others diminiſh in their ſize upward. Each of the bunches is covered with a ſpathe or ſheath of a fine purple colour, which drops off when the flowers open. The upper part of the ſpike is made up of male or barren flowers, which are not ſucceeded by fruit, but fall off with their covers. The fruit, or plantain, is about a foot long, and an inch and a half or two inches diameter: it is at firſt green, but when ripe of a pale-yellow colour. The ſkin is tough; and within is a ſoft pulp of a luſcious ſweet flavour. The ſpikes of the fruit are often ſo large as to weigh upwards of forty pounds. The fruit of this ſort is generally cut before it is ripe. The green ſkin is pulled off, and the heart is roaſted in a clear fire for a few minutes, and frequently turned: it is then ſcraped, and ſerved up as bread. Boiled plantains are not ſo palatable. This tree is cultivated on a very extenſive ſcale in Jamaica; without the fruit of which, Dr. Wright ſays, the iſland would ſcarcely be habitable, as no ſpecies of proviſion could ſupply its place. Even flour or bread itſelf would be leſs agreeable, and leſs able to ſupport the laborious negro, ſo as to enable him to do his buſineſs or to keep in health. Plantains alſo fatten horſes, cattle, ſwine, dogs, fowls, and other domeſtic animals. The leaves, being ſmooth and ſoft, are employed as dreſſings after bliſters. The water from the ſoft trunk is aſtringent, and employed by ſome to check diarrhœas. Every other part of the tree is uſeful in different parts of rural œconomy. The leaves are uſed for napkins and table-cloths, and are food for hogs.

The ſecond ſort differs from the firſt, in having its ſtalks marked with dark purple ſtripes and ſpots. The fruit is ſhorter, ſtraighter, and rounder: the pulp is ſofter, and of a more luſcious taſte. It is never eaten green; but, when ripe, it is very agreeable, either eaten raw or fried in ſlices as fritters; and is reliſhed by all ranks of people in the Weſt-Indies. Both the above plants were carried to the Weſt-Indies from the Canary Iſlands; whither, it is believed, they had been brought from Guinea, where they grow naturally. They are alſo cultivated in Egypt, and in moſt other hot countries, where they grow to perfection in about ten months, from their firſt planting to the ripening of their fruit. When their ſtalks are cut down, ſeveral ſuckers come up from the root, which in ſix or eight months will produce fruit; ſo that, by cutting down the ſtalks at different times, there is a conſtant ſucceſſion of fruit all the year.

In Europe ſome of theſe plants are preſerved in the gardens of curious perſons, who have hot-houſes capacious enough for their reception, in many of which they have ripened their fruit very well; but, as they grow very tall, and their leaves are large, they require more room in the ſtove than moſt people care to allow them. They are propagated by ſuckers, which come from the roots of thoſe plants which have fruited; and many times the younger plants, when they are ſtinted in growth, will alſo put out ſuckers.

The fruit of the banana-tree is four or five inches long, of the ſize and ſhape of a middling cucumber, and of a high grateful flavour: the leaves are two yards long, and a foot broad in the middle; they join to the top of the body of the tree, and frequently contain in their cavities a great quantity of water, which runs out, upon a ſmall inciſion being made into the tree, at the junction of the leaves. Bananas grow in great bunches, that weigh a dozen pounds and upwards. The body of the tree is ſo porous as not to merit the name of wood; the tree is only perennial by its roots, and dies down to the ground every autumn.

When the natives of the Weſt-Indies (ſays Labat) undertake a voyage, they make proviſion of a paſte of banana; which, in caſe of need, ſerves them for nouriſhment and drink: for this purpoſe they take ripe bananas; and, having ſqueezed them through a fine ſieve, form the ſolid fruit into ſmall loaves, which are dried in the ſun or in hot aſhes, after being previouſly wrapped up in the leaves of the Indian flowering-reed. When they would make uſe of this paſte, they diſſolve it in water, which is very eaſily done; and the liquor, thereby rendered thick, has an agreeable acid taſte imparted to it, which makes it both refreſhing and nouriſhing. The banana is greatly eſteemed, and even venerated, by the natives of Madeira, who term it the forbidden fruit, and reckon it a crime almoſt inexpiable to cut it with a knife; becauſe, after diſſection, it exhibits, as they pretend, a ſimilitude of our Saviour's crucifixion; and to cut the fruit open with a knife, is, in their apprehenſion, to wound his ſacred image.

Some authors have imagined, that the banana-tree was that of the leaves of which our firſt parents made themſelves aprons in Paradiſe. The ſacred text, indeed, calls the leaves employed for that purpoſe *fig-leaves;* and Milton, in a moſt beautiful but erroneous deſcription, affirms the bearded or Bengal fig to have been the tree alluded to. But, beſides that the fruit of the banana is often by the moſt ancient authors called a fig, its leaves, by reaſon of their great ſize and ſolidity, were much more proper for a veil or covering than thoſe of the Bengal fig, which are ſeldom above ſix or eight inches long and three broad. On the other hand, the banana-leaves, being four or five feet long, and proportionally broad, were very likely to be pitched upon in preference to all others; eſpecially as they might be ea-

ſily joined, or ſewed together, with the numerous thread-like filaments that may, with the utmoſt facility, be peeled from the body of this tree.

Some have ſuppoſed the Abyſſinian plant *enſete* to be a ſpecies of Muſa. It is ſaid to be a native of the province of Narea, where it grows in the great marſhes and ſwamps for which that province is remarkable, owing to the many rivers which originate in that country, and have but a ſmall declivity to the ocean. This plant, as well as the coffee-tree, is ſaid to have been unknown in Abyſſinia before the arrival of the Galla, who imported them both along with them. It comes to great perfection about Gondar; but the principal plantations of it are in that part of Maitſha and Gouth, to the weſt of the Nile, where it is almoſt the ſole food of the Galla who inhabit that country. Maitſha is almoſt entirely on a dead level; ſo that the rains ſtagnate, and prevent the ſowing of grain. Were it not for the enſete, therefore, the Galla would have ſcarcely any vegetable food. Mr. Bruce thinks that the enſete may have been cultivated in ſome of the gardens of Egypt about Roſetta, but that it was not a native of the country. He ſtrongly controverts the opinion that this plant is a ſpecies of Muſa. "It is true (ſays he), the leaf of the banana reſembles that of the enſete: it bears figs, and has an excreſcence from its trunk, which is terminated by a conical figure, chiefly differing from the enſete in ſize and quantity of parts; but the figs of the banana are of the ſize and figure of a cucumber, and this is the part which is eaten. This fig is ſweet, though mealy, and of a taſte highly agreeable. It is ſuppoſed to have no ſeeds, though in fact there are four ſmall black ſeeds belonging to every fig. But the figs of the enſete are not eatable: they are of a ſoft tender ſubſtance, watery; taſteleſs, and in colour and conſiſtence reſembling a rotten apricot: they are of a conical form, crooked a little at the lower end; about an inch and a half in length, and an inch in breadth where thickeſt. In the inſide of theſe is a large ſtone half an inch long, of the ſhape of a bean or caſhew-nut, of a dark-brown colour; and this contains a ſmall ſeed, which is ſeldom hardened into fruit, but conſiſts only of ſkin. The long ſtalk that bears the figs of the enſete ſprings from the centre of the plant, or rather is the body or ſolid part of the plant itſelf. Upon this, where it begins to bend, are a parcel of looſe leaves; then grows the fig upon the body of the plant without any ſtalk; after which the top of the ſtalk is thick ſet with ſmall leaves, in the midſt of which it terminates the flower in the form of an artichoke; whereas in the banana, the flower in form of the artichoke grows at the end of that ſhoot or ſtalk which proceeds from the middle of the plant, the upper part of which bears the row of figs. The leaves of the enſete are a web of longitudinal fibres cloſely ſet together; and they grow from the bottom without ſtalks: whereas the banana is in form like a tree, and has been miſtaken for ſuch. One half of it is divided into a ſtem, the other is a head formed with

leaves;

leaves; and, in place of the ſtem that grows out of the enſete, a number of leaves, rolled round together like a truncheon, ſhoots out of the heart of the banana, and renews the upper as the under leaves fall off: but all the leaves of the banana have a long ſtalk; this fixes them to the trunk, which they do not embrace by a broad baſe, or involucrum, as the enſete does.

"But the greateſt differences are ſtill remaining. The banana has by ſome been miſtaken for a tree of the palmaceous kind, for no other reaſon but a kind of ſimilarity in producing the fruit on an excreſcence or ſtalk growing from the heart of the ſtem; but ſtill the muſa is neither woody nor perennial; it bears the fruit but once; and in all theſe reſpects it differs from trees of the palmaceous kind, and indeed from all ſorts of trees whatever. The enſete, on the contrary, has no naked ſtem; no part of it is woody: the body of it, for ſeveral feet high, is eſculent; but no part of the banana-plant can be eaten. As ſoon as the ſtalk appears perfect and full of leaves, the body of the plant turns hard and fibrous, and is no longer fit to be eaten: before, it is the beſt of all vegetables. When boiled, it has the taſte of the beſt new wheat-bread not perfectly baked. When you make uſe of the enſete for eating, you cut it immediately above the ſmall detached roots, and perhaps a foot or two higher, as the plant is of age. The green muſt be ſtripped from the upper part till it becomes white; when ſoft, like a turnip well boiled, if eaten with milk or butter, it is the beſt of all food, wholeſome, nouriſhing, and eaſily digeſted."

Our author now proceeds to conſider an hieroglyphic ſometimes met with in Egypt, viz. the figure of Iſis ſitting between ſome branches of the banana-tree, as is ſuppoſed, and ſome handfuls of ears of wheat. You ſee likewiſe the hippopotamus ravaging a quantity of the banana-tree. Yet the banana is merely adventitious in Egypt: it is a native of Syria: it does not even exiſt in the low hot country of Arabia Felix; but chooſes ſome elevation in the mountains where the air is temperate; and is not found in Syria farther to the ſouthward than lat. 34°.

Upon this account Mr. Bruce thinks, that the banana, not being a plant of the country, "could never have entered into the liſt of their hieroglyphics; for this reaſon, it could not figure any thing regular or permanent in the hiſtory of Egypt or its climate. I therefore imagine (adds he) that this hieroglyphic was wholly Ethiopian; and that the ſuppoſed banana, which, as an adventitious plant, ſignified nothing in Egypt, was only a repreſentation of the enſete; and that the record in the hieroglyphic of Iſis and the enſete-tree was ſomething that happened between harveſt, which was about Auguſt, and the time that the enſete-tree came in uſe, which was in October.—The hippopotamus is generally thought to repreſent a Nile that has been ſo abundant as to be deſtructive. When, therefore, we ſee upon obeliſks the hippopotamus deſtroying the banana, we may ſuppoſe it meant that the extraordinary

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Turkey Rhubarb.

nary inundation had gone ſo far as not only to deſtroy the wheat, but alſo to retard or hurt the growth of the enſete, which was to ſupply its place."

TURKEY RHUBARB. Rheum.

RHUBARB is a genus of the claſs enneandria, order trigynia. Its characters are theſe: The flower has no empalement; it hath one petal, which is narrow at the baſe, and impervious; the brim is cut into ſix parts, which are obtuſe, and alternately ſmaller; it hath nine hair-like ſtamina inſerted in the petal, and of the ſame length, terminated by oblong ſummits, which are obtuſe; and a ſhort three-cornered germen, with ſcarcely any ſtyle, crowned by three-feathered ſtigmas, which are reflexed; the germen afterwards becomes a large three-cornered ſeed, with acute membranaceous borders. Miller reckons four, and Linnæus five, ſpecies. The true rhubarb is now ſown in many gardens; and may probably ſucceed ſo well here in time, as that a ſufficient quantity of that valuable drug may be raiſed to ſupply our conſumption.

The rhubarb with hairy leaves and equal foot-ſtalks has been generally reckoned the true rhubarb plant, having been produced from the ſeeds ſent from Ruſſia, as thoſe of the true rhubarb, to Juſſieu of Paris, Rand at Chelſea, and Linnæus at Upſal. It is a native of China and Siberia, and has been raiſed in ſome of our own gardens, where it is found to grow with vigour in the open ground. Some have derived its name from *Rha*, the river called by us Wolga, and *barbarum;* q. d. "the root found by the *barbarians* on the river *Rha*." However it is neceſſary to obſerve, that Dr. Hope received, in 1763, rhubarb-ſeeds from Ruſſia, which Dr. Mounſey aſſured him were the ſeeds of the true rhubarb; and, having ſown them in the open ground at Edinburgh, they produced a different ſpecies, viz. the *Rheum palmatum Linnæi*, with the leaves deeply cut into pointed ſegments. He obſerves that the root of this plant, though taken up too young, and at an improper ſeaſon, viz. in July, agreed perfectly with the beſt foreign rhubarb in colour, ſmell, taſte, and purgative quality. See his botanical deſcription and drawing of the plant in Phil. Tranſ. vol. lv. art. 32. Perhaps, ſays Dr. Lewis, the roots of both ſpecies may be of the ſame quality, and taken promiſcuouſly. The rhaponticum is a different ſpecies from either of theſe. Mr. Bell informs us, in his Travels, that the beſt rhubarb grows in that part of the Eaſtern Tartary called Mongallia, which ſerves as a boundary between Ruſſia and China. This plant, he ſays, does not run and ſpread itſelf like docks, but grows in tufts at uncertain diſtances, as if the ſeeds had been dropped with deſign. As the Mongalls do not think it worth cultivating, the marmots, which burrow under the ſhade of its ſpreading leaves, and probably feed on its leaves and roots, contribute to its increaſe, partly by the manure which their dung affords it, and principally by caſting up and looſening the earth, into which

the ripe ſeeds blown by the wind fall, and where they immediately take root. After digging and gathering the rhubarb, the Mongalls cut the large roots into ſmall pieces, in order to make them dry more readily. In the middle of every piece they ſcoop a hole, through which a cord is drawn, in order to ſuſpend them in a convenient place; and by this practice they deſtroy ſome of the beſt part of the root.

All rhubarb-plants, ſays Millar, are propagated by ſeeds, which ſhould be ſown in autumn ſoon after they are ripe, and then the plants will come up the following ſpring; whereas, if they are ſown in the ſpring, they will not come up till the next ſpring. The plants ſhould remain where the ſeeds are ſown; and, when they appear in the ſpring, the ground ſhould be hoed to cut up the weeds, and they ſhould be thinned, like carrots and parſnips, leaving them at the firſt hoeing ſix or eight inches aſunder, and, at the ſecond hoeing, at the diſtance of at leaſt a foot and a half. After this the plants will require no other culture but to keep them clean from weeds. In autumn the leaves decay, when the ground ſhould be made clean; and it ſhould alſo be hoed and cleaned in the ſpring, when the plants put out their new leaves. In the ſecond year after they come up, the ſtrongeſt will produce flowers and ſeeds; and, in the third year, moſt of them will flower. The roots will remain many years without decaying; and it is ſaid, that the old roots of the true rhubarb are much preferable to the young ones. They delight in a rich ſoil, not too dry nor too moiſt, and where there is a good depth for their roots to run down; in ſuch land their leaves will be very large, and their roots will grow to a great ſize.

Two ſorts of rhubarb-roots are met with in the ſhops. The firſt is imported from Turkey and Ruſſia, in roundiſh pieces, freed from the bark, with a hole through the middle of each, externally of a yellow colour, internally variegated with lively reddiſh ſtreaks. The other, which is leſs eſteemed, comes immediately from the Eaſt-Indies in longiſh pieces, harder, heavier, and more compact, than the foregoing. The firſt ſort, unleſs kept very dry, is apt to grow mouldy and worm-eaten; the ſecond is leſs ſubject to theſe inconveniences. Some of the more induſtrious artiſts are ſaid to fill up the worm-holes with certain mixtures, and to colour the outſide of the damaged pieces with powder of the finer ſorts of rhubarb, and ſometimes with cheaper materials. The marks of the goodneſs of rhubarb are, the livelineſs of its colour when cut; its being firm and ſolid, but not flinty or hard; its being eaſily pulverable, and appearing, when powdered, of a fine bright yellow colour; its imparting to the ſpittle, on being chewed, a deep ſaffron tinge, and not proving ſlimy or mucilaginous in the mouth. Its taſte is ſub-acrid, bitteriſh, and ſomewhat ſtyptic; the ſmell is lightly aromatic.

Rhubarb is a mild cathartic, and commonly conſidered as one of the ſafeſt and moſt innocent of the ſubſtances of this claſs. Beſides its purgative virtue, it has a

mild aſtringent one, diſcoverable by the taſte, and by its ſtriking an inky blackneſs with chalybeate ſolutions; hence it is found to ſtrengthen the tone of the ſtomach and inteſtines, to leave the belly coſtive, and to be one of the moſt uſeful purgatives in diarrhœas, dyſenteries, and all diſorders proceeding from a debility and laxity of the fibres: it is frequently given with a view to this ſtomachic and corroborating virtue, rather than to its producing any conſiderable evacuations. It tinges the urine of a high yellow colour. Rhubarb in ſubſtance purges more effectually than any preparation of it: the doſe is from a ſcruple to a dram. By roaſting it with a gentle heat, till it becomes eaſily friable, its cathartic power is diminiſhed, and its aſtringency ſuppoſed to be increaſed. The purgative virtue of rhubarb is extracted more perfectly by water than by rectified ſpirit; the root remaining after the action of water is almoſt if not wholly inactive; whereas, after repeated digeſtion in ſpirit, it proves ſtill very conſiderably purgative: when the rhubarb has given out to ſpirit all that this menſtruum can extract, it ſtill imparts a deep colour, as well as a purgative impregnation, to water. A dram of the extract, formed by inſpiſſating the watery infuſion, is not more efficacious than a ſcruple of the root in ſubſtance; but half a dram of the extract formed from the ſpirituous tincture proves moderately purgative, though ſcarcely more ſo than an equal quantity of the powder. The ſpirituous extract diſſolves almoſt wholly in water; and hence the tincture, like the ſpirituous infuſions of moſt other vegetables, does not turn milky on being mixed with aqueous liquors; of the watery extract ſcarcely above one fourth is diſſolved by rectified ſpirit, and the part that does not diſſolve proves more purgative than that which does. Hence it appears, that rhubarb contains much more gummy or mucilaginous than reſinous matter; and its purgative quality ſeems to reſide chiefly in a combination of gummy and ſaline matter.

Tinctures of this root are drawn in the ſhops with proof-ſpirit and with mountain-wine, in the proportion of an ounce of rhubarb to a pint of the menſtruum. Theſe preparations, uſed chiefly as mildly-laxative corroborants, in weakneſs of the ſtomach, indigeſtion, diarrhœas, colicky and other ſuch complaints, are commonly aromatiſed with a little cardamom-ſeeds and ſaffron, as two drams of the former and one of the latter to the above quantity of the root, and thus are formed the *tinctura rhei vinoſa & ſpirituoſa.* For ſome purpoſes, a tincture, called *tinctura rhei dulcis,* is drawn from the rhubarb and cardamom-ſeeds with proof-ſpirit, and two ounces of white ſugar-candy diſſolved in the ſtrained liquor. For others, inſtead of ſweets and aromatics, gentian and ſnake-root are joined, in the proportion of a dram and a half of the former and a dram of the latter, with the addition of a ſcruple of cochineal as a colouring ingredient; this laſt tincture, called *tinctura*

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rhei amara, is, in many cafes, an ufeful affiftant to the Peruvian bark in the cure of intermittents.

The Turkey rhubarb is generally preferred to the Eaft-India fort, though the latter is more aftringent, but has fomething lefs of an aromatic flavour. Tinctures made from both, with equal quantities of rectified fpirit, have nearly the fame tafte: on drawing off the menftrua, the extract left by the tincture of the Eaft-India rhubarb proves in tafte confiderably ftronger than the other. They feem both, fays Dr. Lewis, to be the produce of the fame climate, and roots of the fame fpecies of plant, taken up probably at different feafons, or cured in a different manner.

The yellow colour of rhubarb, it is faid, is much lefs deftructible than many other vegetable yellows. Aqua-fortis, and other acids which deftroy the colour of faffron, turmeric, &c. make no change in that of rhubarb, or at moft render it only turbid. Volatile fpirits heighten the colour, and incline to red. Fixed alkaline falts have this effect in a greater degree. Mr. Model affirms that a confiderable quantity of felenites is contained in rhubarb. In one experiment he obtained fix ounces of felenites from four pounds of rhubarb; and, in the other, no lefs than an ounce of felenites from two ounces and five drams of old rhubarb.

The Indian rhubarb fown in our gardens has this peculiar property, that it yields a fine and clear gum. This is perfectly white and pellucid; and in the months of June and July is fo plentiful, that an ounce may fometimes be gathered at a time from one plant of it. It exfudates of itfelf from all parts of the ftalks and ribs of the leaves, and fometimes from the under part of the leaves themfelves. It ftands in fome places in large drops, and in others the ftalks, &c. feem only to be covered with a thin layer of it; and the under part of the leaves in fome have it in form of twifted wires or long icicles. The plant may always be feen wounded by a fort of cauftic in the places where the germen makes its way out, and thefe may be followed with any pointed inftrument through the fkin; in fome parts of the plant this juice is found to be turned gummy within it, and looks like clear ice. As this is the only known herbaceous plant that yields a true gum like that of trees, it would be worthy obfervation, whether fome of our own plants may not have fome tendency of nature to form a juice of the fame kiud. It would be moft proper to look for this in the plants of the fame genus, and as nearly related to the rhubarb as we can. The docks, fo common about our fields, are of the fame genus; and the forrel fhows by its tafte, that it is particularly allied to the plant; for both are alike of the dock-kind, and both alike four. It would be proper to look carefully about the leaves of forrel a little before it flowers, to fee whether any thing like the fame gum appears on it.

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The Indian Rocu.

There is yet this farther analogy between this rhubarb and our common ſorrel: that the huſks of our ſorrel, boiled in water, with a little alum, turn it to a fine red colour, and the huſks of rhubarb do the ſame; and both the one and the other often turn red in decaying.

The juice of the roots of this rhubarb, extracted by bruiſing and ſteeping it in common water, when the liquor is ſtrained and evaporated, becomes only a clear uninflammable gum, and melts in the flame of a candle. This gum, as well as that of the ſtalks and leaves, is of an inſipid taſte; and it is obſervable, that, though the plant naturally yields it in ſo large a quantity, yet it will not flow from wounds made by art in any part of the plant. Upon the conſideration of the inſipid taſte of this gum, and its ſolubility in water, we may find ſome probable conjecture in regard to the different virtues of this plant in purging and binding.

The woody fibres have a ſtrong taſte; and, in all probability, are alone endued with the aſtringent quality. An infuſion of rhubarb is known to purge, and a powder of it to bind: the reaſon is eaſily ſeen on this conſideration. The water in infuſion takes up all this gummy juice, and its other juices, but leaves the fibroſe part behind, in conſequence of which it ought to purge without binding; but, in caſe of giving the powder, the juices are in great part evaporated in the drying, and the woody part left almoſt alone; it therefore purges but little, and proves powerfully aſtringent.

INDIAN ROCU. Mitella.

THE rocu is a tree of conſiderable ſtature, bearing flowers of a pale red, like the European apple-bloſſoms. When the flowers fall off, a head of ſeed follows, of an oblong roundiſh form, and prickly, like a cheſnut. This contains that beautiful red ſeed, which the Indians break or macerate, and, putting it in water, it ſinks to the bottom, converting the fluid into a moſt elegant tranſparent red tincture. This tincture they pour off at their leiſure, and the ſediment which the ſeeds form at the bottom they ſuffer to dry in little cakes, with which they paint their naked bodies in various figures, which they eſteem a very great ornament.

This tree is the *urucu* of Piſo; and Tournefort, having joined it with the two ſpecies of Cortuſa Americana, calls it *Mitella;* for the fruit of this, as well as the Cortuſa Americana, burſts open and repreſents the ſhape of an epiſcopal mitre; and therefore he entitles it, in his Inſtitut. Rei Herb. the *Mitella Americana, maxima tinctoria.*

SPEEDWELL. Veronica.

THE flower of ſpeedwell has a permanent empalement, cut into five acute ſegments, and one tubulous petal the length of the empalement; the brim is cut into four oval plain ſegments which ſpread open, and two ſtamina which are terminated by oblong ſummits; it has a compreſſed germen, ſupporting a ſlender declining ſtyle, crowned by a ſingle ſtigma; the germen becomes a compreſſed heart-ſhaped capſule, with two cells filled with roundiſh ſeeds.

The common male ſpeedwell is alſo called Paul's betony; brook-lime is alſo a ſpecies of the ſpeedwell. Some authors make thirty-five ſpecies.

This herb is in great eſteem among the Germans in diſorders of the breaſt, both catarrhous and ulcerous, and for purifying the blood and humours. Infuſions of the leaves, which are not unpalatable, are drunk as tea, and are found to operate ſenſibly by urine. It is frequently uſed as an ingredient in antiſcorbutic and deobſtruent compoſitions.

STARRY ANISEED. Illicium.

WE meet with an account of the ſtarry aniſeed, together with a figure of it, taken from Cluſius, in Parkinſon's Theatre of Plants, p. 1569. where he obſerves, that ſome branches of it, with the huſks and ſeeds only, without leaves or bloſſoms, were brought into England by Sir Thomas Cavendiſh, in Queen Elizabeth's time, from the Philippine Iſlands, where he met with it in his voyage round the world. Theſe branches were given to Mr. Morgan, the queen's apothecary, and to Mr. James Garrat, of whom Cluſius received them.

Monſieur Geoffroy, in his Materia Medica, tranſlated in 1736 by Dr. G. Douglaſs, p. 322, calls it *Aniſum Sinenſe, ſemen badian, & fructus ſtellatus*, and ſays it is highly eſteemed in China, and all over the eaſt; that it is uſed to cure any bad taſte in the mouth, as a preſervative againſt the effects of bad air, and alſo for the ſtone and gravel; and that the Indians likewiſe ſteep this fruit in water, and afterwards ferment the infuſion, and thus make a vinous liquor; that the Dutch in the Eaſt-Indies, as well as the natives, mix this fruit with their tea and ſherbet.

Kæmpfer in his Amœnitates Exoticæ, p. 880, calls it *ſomo*, or *ſkimmi*; and has given us a very good figure of a branch of it, with the leaves, flowers, and fruit. He found it in Japan; and ſays that the Japaneſe and Chineſe eſteem it a ſacred tree; that they offer it to their idols, and burn the bark of it, as a perfume, on their altars; and lay the branches upon the graves of the dead, as an offering to the ghoſts of their pious departed friends; and that the public watchmen uſe the powder of this aromatic bark ſtrewed in ſmall winding grooves or little channels, on

ſome aſhes in a box ſecured from the weather, for the following purpoſe: This powder, being lighted at one end, burns ſlowly on; and, being come to certain marked diſtances, and ſo ſparkling through the grooves, they ſtrike a bell, and by means of this time-keeper proclaim the hours of the night to the public. And laſtly, that it has the remarkable property of rendering the poiſon of the bladder-fiſh (*Tetrodon hiſpidus*, Linn. Syſt. Nat.) more virulent, as many have experienced, that have uſed violent means to deſtroy themſelves.

We are indebted for the firſt diſcovery of this curious American tree to a negro ſervant of William Clifton, Eſq. chief juſtice of Weſt Florida, who was ſent to collect ſpecimens of all the rarer plants by his maſter, in April 1765. After this, in the latter end of January, 1766, Mr. John Bartram, the king's botaniſt for the Floridas, diſcovered it on the banks of the river St. John, in Eaſt Elorida, as appears from his deſcription of it, and the drawing of a ſeed-veſſel, with ſome of the leaves, which he ſent to Peter Collinſon, Eſq. Mr. Bartram's deſcription of it is as follows: "Near here my ſon found a lovely ſweet tree, with leaves like the ſweet bay, which ſmelled like ſaſſafras, and produced a very ſtrange kind of ſeed-pod; but all the ſeed was ſhed, the ſevere froſt had not hurt it: ſome of them grew near twenty feet high, a charming bright ever-green aromatic."

This obſervation of Mr. Bartram, relating to its bearing a ſevere froſt, may afford a uſeful hint in the cultivation of this tree, eſpecially as I am convinced, from repeated accounts of the weather in Weſt Florida, that the froſt is much more intenſe there, from whence thoſe plants were brought, than in Eaſt Florida; ſo that the experiment is well worth making with one of them, to ſee how far it will ſtand the ſeverity of our winters. Should it ſucceed, it would be a very great acquiſition to our gardeners, and be highly ornamental to our plantations of ever-greens.

The medicinal properties of this tree are certainly worth enquiring into. The leaves afford a moſt agreeable bitter. A ſprig of it ſet to putrify in a phial of water, the bark ſoon became full of a clear mucilage. The young bloſſoms, put into water with a ſmall quantity of tartar *per deliquium*, from a dark-reddiſh colour became a light-brown; but, from the ſame proportion of oil of vitriol in water, they turned to a fine carmine colour, which ſtained the paper of a fine red. This points out its aſtringent quality.

Many perſons think this plant not really a different ſpecies from the oriental one. The ſeed-veſſels from China, however, which are to be ſeen in collections of the Materia Medica, eſpecially among foreigners, ſmell very diſagreeably of aniſeed: whereas the ſeed-veſſel of the Floridanum is agreeably aromatic, as are the leaves and young branches. The flower, according to Kæmpfer, is of a yellowiſh white, and looks at a diſtance like a narciſſus: the preſent ſpecies has a

flower

flower of a dark-red colour. Kæmpfer reckons the number of petals ſixteen, and the rays or ſeed-veſſels eight: the number of petals in ours is from twenty-one to twenty-ſeven, and the ſeed-veſſel twelve or thirteen that ripen. In reſpect to the form and growth of the tree, they are much the ſame; for inſtance, they both grow to the ſize of a cherry-tree; their leaves are of an oblong oval ſhape, pointed at both ends, fleſhy, with few veins, growing alternately, and in tufts, at the ends of the ſmall branches.

Linnæus, who takes his characters of the *Illicium aniſatum* from Kæmpfer, places it among the dodecandria polygynia. But I am perſuaded, that, from the following characters, this muſt be of the polyandria polygynia, and ſhould ſtand next to the Magnolia.

Characters of the Illicium Floridanum, or Florida Starry Aniſeed Tree.

Calyx. The perianthium, or flower-cup, conſiſts commonly of five little membranceous and coloured leaves, that ſoon fall off; they are of a concave, oblong, oval, form, pointed at the ends. Sometimes we meet with only four little leaves, ſometimes ſix, in the flower-cup. Kæmpfer obſerved four in his.

Corolla. The flower conſiſts of many petals (from twenty-one to twenty-ſeven), which are lanceolated: theſe are of three ſizes, and equal numbers in each circle, the outward ones are long, (about an inch,) concave, obtuſe, and ſpreading open. The next are a little ſhorter and narrower; and the innermoſt are ſtill ſhorter, much narrower, aud very ſharp-pointed: but are not nectaria, as Linnæus ſuppoſes.

Stamina. The filaments are many, (about thirty,) very ſhort and flat, placed over one another, ſurrounding the germina, or embryo ſeed-veſſels. Theſe ſupport as many antheræ, or ſummits, which are erect, oblong, and emarginated, or having a ſmall indenture at top, with a cell on each ſide full of farina, of a globular form when they are magnified.

Pistillum, or female organ. The germina, or embryo ſeed-veſſels, are twenty or more in number, placed in a circalar order above the receptacle of the flower: they are compreſſed, erect, and ending in ſo many ſharp-pointed, ſtyles, bending outwards at the top. The ſtigmata, or openings on the top of the ſtyles, are downy, and placed lengthways along the upper part of each ſtyle.

Pericarpium, or ſeed-veſſel, conſiſts of twelve, oftener thirteen, little pods, or capſules, that ripen. Theſe are of a compreſſed oval ſhape, and a hard leather-like ſubſtance, with two valves to each, and are diſpoſed edgeways in a circular order, like ſo many rays of a ſtar.

Semina. The ſeeds are ſmooth and ſhining, of an oval ſhape, a little compreſſed, and appear obliquely cut off at the baſe. There is one ſeed in each capſule.

SUGAR

SUGAR MAPLE TREE. ACER.

An Account of the Sugar Maple Tree of the United States, and of the Methods of obtaining Sugar from it, together with Obſervations upon the Advantages, both public and private, of this Sugar: in a Letter to Thomas Jefferſon, Eſq. Secretary (afterwards Preſident) of the United States, and one of the Vice-Preſidents of the American Philoſophical Society; by Benjamin Ruſh, Profeſſor of the Inſtitutes, and of Clinical Medicine in the Univerſity of Philadelphia.

THE ſubject of this excellent paper ſeems at firſt ſight more particularly to relate to the United States; but it may, and we hope will, very eſſentially affect the general ſtate of the world, by increaſing the ſupply of an article, of which the uſes are yet, on account of its high price, but imperfectly known. If the monopoly of the Weſt-India iſlands, where alone the waſteful culture by ſlaves, in the abſence of the owner, can be ſupported, ſhould be gradually diminiſhed, and at laſt aboliſhed, by a plentiful produce of ſugar from the maple, humanity would no longer ſuffer, the article would find its true level, and every nation would be more or leſs benefited.

The *Acer ſaccharinum* of Linnæus, or ſugar maple tree, grows in great quantities in the weſtern countries of all the middle ſtates of the American union. It is as tall as the oak, and from two to three feet in diameter; puts forth a white bloſſom in the ſpring, before any appearance of leaves: its ſmall branches afford ſuſtenance for cattle, and its aſhes afford a large quantity of excellent pot-aſh. Twenty years are required for it to attain its full growth. Tapping does not injure it; but, on the contrary, it affords more ſyrup and of a better quality, the oftener it is tapped. A ſingle tree has not only ſurvived, but flouriſhed, after tapping, for forty years. Five or ſix pounds of ſugar are uſually afforded by the ſap of one tree—though there are inſtances of the quantity exceeding twenty pounds. The ſugar is ſeparated from the ſap either by freezing, by ſpontaneous evaporation, or by boiling. The latter method is the moſt uſed. Dr. Ruſh deſcribes the proceſs, which is ſimple, and practiſed without any difficulty by the farmers.

From frequent trials of this ſugar, it does not appear to be in any reſpect inferior to that of the Weſt-Indies. It is prepared at a time of the year when neither inſects nor the pollen of plants exiſt to vitiate it, as is the caſe with common ſugar. From calculations grounded on exiſting facts, it is aſcertained, that America is now capable of producing one eighth more than its own conſumption; that is, on the whole, about 135,000,000 pounds, which in the country may be valued at fifteen pounds weight for one dollar. Dr. Ruſh mentions many other benefits his country may derive from this invaluable tree; and concludes his paper with an account of ſome of the advantages of ſugar to mankind, not merely as commonly conſidered to be a luxury, but as an excellent, wholeſome, and nouriſhing, article of food.

TEA-TREE. Thæa.

THE tea-tree, *thea* in botany, is the name of a genus of the claſs polyandria, order monogynia, the characters of which are theſe: The cup is a very ſmall, plane, permanent, perianthium, divided into five or ſix roundiſh, obtuſe, leaves; the flower conſiſts of ſix or nine large, roundiſh, concave, and equal, petals; the ſtamina are numerous filaments, about two hundred, and are very ſlender, capillary, and ſhorter than the flower; the antheræ are ſimple; the germen of the piſtil is globoſe and trigonal; the ſtyle is ſubulated, and of the length of the ſtamina; the ſtigma is ſimple; the fruit is a capſule, formed of three globular bodies growing together; it contains three cells, and opens into three parts at the top. The ſeeds are ſingle, globoſe, and internally angulated.

From an original drawing taken of the tree when in its flowering ſtate, it appears, that the tea-tree, as Mr. Miller firſt obſerved, belongs to the order of trigynia; and Linnæus was led to the miſtake of placing it in that of monogynia, by not having had any opportunity of examining any other than dried ſpecimens of this ſhrub. Of this genus Linnæus enumerates two ſpecies: viz. the Bohea Tea, having flowers with ſix petals; and the Green Tea, having flowers with nine petals.

Dr. Lettſom, in his botanical deſcription of the tea-plant, thinks it moſt probable that there is only one ſpecies, and that the difference between the green and bohea teas depends on the nature of the ſoil, culture, age, and the manner of drying the leaves. He adds, that it has even been obſerved, that a green-tea tree, planted in the bohea country, will produce bohea, and on the contrary; and that on his examining ſeveral hundred flowers, brought both from the bohea and green tea countries, their botanical characters have always appeared uniform.

We are principally indebted to Kæmpfer, Le Compte, and Du Halde, for an authentic hiſtory of the culture of this exotic ſhrub, and the manner of preparing or curing its leaves. The particulars of greateſt importance that have been recited have been judiciouſly collected, and the ſubject farther illuſtrated with additional obſervations, by Dr. Lettſom.

The tea-tree thrives beſt in valleys at the foot of mountains, and upon the banks of rivers, where it enjoys a ſouthern expoſure to the ſun; though it endures conſiderable variations of heat and cold, as it flouriſhes in the northern clime of Pekin, as well as about Canton; and it is obſerved that the degree of cold at Pekin is as ſevere in winter as in ſome of the northern parts of Europe. However, the beſt tea grows in a mild temperate climate, the country about Nankin producing better tea than either Pekin or Canton, betwixt which places it is ſituated.

The

The Tea Tree.

Criswell delin. Barlow sculp.

The root reſembles that of the peach-tree; the leaves are green, longiſh at the point, and pretty narrow, an inch and a half long, and jagged all round. The flower is much like that of the wild roſe, but ſmaller. The fruit is of different forms, ſometimes round, ſometimes long, ſometimes triangular, and of the ordinary ſize of a bean, containing two or three ſeeds, of a mouſe-colour, including each a kernel. Theſe are the ſeeds by which the plant propagated: a number from ſix to twelve or fifteen being promiſcuouſly put into one hole, four or five inches deep, at certain diſtances from each other. The ſeeds vegetate without any other care, though the more induſtrious annually remove the weeds and manure the land. The leaves which ſucceed are not fit to be plucked before the third year's growth, at which period they are plentiful, and in their prime.

In about ſeven years the ſhrub riſes to a man's height; and, as it then bears few leaves, and grows ſlowly, it is cut down to the ſtem, which occaſions an exuberance of freſh ſhoots and leaves the ſucceeding ſummer; ſome, indeed, defer cutting them till they are of ten years growth. In Japan, the tea-tree is cultivated round the borders of the fields, without regard to the ſoil; but, as the Chineſe export conſiderable quantities of tea, they plant whole fields with it.

The beſt time to gather the leaves of tea, is while they are yet ſmall, young, and juicy; and the different periods in which they are gathered are particularly deſcribed by Kæmpfer. They are plucked carefully one by one; and, notwithſtanding the ſeeming tedioufneſs of this operation, the labourers are able to gather from four to ten or fifteen pounds each in one day. The tea-trees that yield often the fineſt leaves grow on the ſteep declivities of hills, where it is dangerous, and in ſome caſes impracticable, to collect them. The Chineſe are ſaid to vanquiſh this difficulty by a ſingular contrivance: the large monkeys which inhabit theſe cliffs are irritated, and in revenge they break off the branches, and throw them down, ſo that the leaves are thus obtained.

The buildings, or drying-houſes, that are erected for curing tea, contain from five to ten or twenty ſmall furnaces, about three feet high, each having at the top a large flat iron pan. There is alſo a long low table covered with mats, on which the leaves are laid, and rolled by workmen, who ſit round it. The iron pan being heated to a certain degree by a little fire made in the furnace underneath, a few pounds of the freſh-gathered leaves are put upon the pan; the freſh and juicy leaves crack when they touch the pan, and it is the buſineſs of the operator to ſhift them as quick as poſſible with his bare hands, till they become too hot to be eaſily endured. At this inſtant he takes off the leaves with a kind of ſhovel reſembling a fan, and pours them on the mats before the rollers, who, taking ſmall quantities at a time, roll them in the palms of their hands in one direction, while others are fanning them,

that they may cool the more ſpeedily, and retain their curl the longer. This proceſs is repeated two or three times, or oftener, before the tea is put into the ſtores, in order that all the moiſture of the leaves may be thoroughly diſſipated, and their curl more completely preſerved. On every repetition the pan is leſs heated, and the operation performed more ſlowly and cautiouſly. The tea is then ſeparated into the different kinds, and depoſited in the ſtore for domeſtic uſe or exportation.

The Chineſe know nothing of imperial tea, flower of tea, and many other names, which in Europe ſerve to diſtinguiſh the goodneſs and the price of this faſhionable commodity; but, beſides the common tea, they diſtinguiſh two other kinds, viz. the *voui* and *ſoumlo*, which are reſerved for people of the firſt quality, and thoſe who are ſick. We have two principal kinds of tea in Europe: viz.

Green tea, which is the common tea of the Chineſe, &c. F. le Compte calls it *bing-tea*, and ſays it is gathered from the plant in April. It is held very digeſtive and a little aſtringent; it gives a paliſh-green tincture to water, and its leaves are much twiſted. The ſecond is,

Bohea tea, which is the *voui-tea*, *bou-tcha*, of the Chineſe. F. le Compte makes this only differ from the green tea by its being gathered a month before it, viz. in March, while in the bud; and hence the ſmallneſs of the leaves, as well as the depth of the tincture it gives to the water. Others take it for the tea of ſome particular province; the ſoil being found to make an alteration in the properties of the tea, as much as the ſeaſon of gathering it. It is all bought at Nankin, and thence brought into Europe.

As to the differences in colour and flavour peculiar to theſe two kinds, and to their varieties, Dr. Lettſom thinks that there is reaſon to ſuſpect that they are, in ſome meaſure, adventitious, or produced by art. He has been informed by intelligent perſons, who have reſided ſome time at Canton, that the tea about that city affords very little ſmell while growing. The ſame is obſerved of the tea-plants now in England, and alſo of the dried ſpecimens from China. We are not, however, as he obſerves, to conclude from hence, that art alone conveys to teas, when cured, the ſmell peculiar to each kind; for our vegetable graſſes, for inſtance, have little or no ſmell till they are dried and made into hay.

As to the opinion that the green tea owes its verdure to an efflorescence acquired from the plates of copper on which it is ſuppoſed to be cured or dried, he ſhows that there is no foundation for this ſuſpicion. The infuſions of the fineſt imperial and bloom teas undergo no change on the affuſion of a volatile alkali, which would detect the minuteſt portion of copper contained in them, by turning the liquors blue. The fine green colour of theſe teas, with as little reaſon, hath been attributed to green copperas; as this metallic ſalt would, on its being diſſolved in water, immediately

ately act on the aſtringent matter of the leaves, and convert the infuſion into ink, as happens when a chalybeate water has been employed in the making of tea.

On the whole Dr. Lettſom thinks it not improbable, that ſome green dye, prepared from vegetable ſubſtances, is employed in the colouring of the leaves of the green teas. And Neumann ſuſpects, that the brown colour and the flavour of the bohea ſorts are introduced by art. Both the green and bohea teas have an agreeable ſmell, and a ſlightly-bitteriſh ſubaſtringent taſte; with ſolution of chalybeate vitriol, they ſtrike an inky blackneſs. They give out their ſmell and taſte both to watery and ſpirituous menſtrua; to water, the green ſorts communicate their own green tincture, and the bohea their brown; but to a rectified ſpirit they both impart a fine deep green. The extracts, obtained by gently drawing off the menſtrua from the filtered tinctures, are very conſiderably aſtringent, and not a little ungrateful; but the ſpirituous moſt ſo.

Savary alſo ſpeaks of a ſort of red tea, or Tartar tea, called *honan tcha*, which tinges the water of a pale red, and which is ſaid to be extremely digeſtive; by means hereof it is that the Tartars are ſaid to be able to feed on raw fleſh. Its taſte is earthy, and much the leaſt agreeable of them all; but this is ſcarcely known in England.

Tea is to be choſen of the briſkeſt ſmell, and as whole as poſſible; and the greateſt care is to be taken that it have not been expoſed to the air to pall and evaporate.

The drink, tea, is made in China, and throughout the greateſt part of the eaſt, after the ſame manner as in Europe; viz. by infuſing the leaves in boiling water, and drinking the infuſion hot. Indeed, among us, it is uſual to temper its bitterneſs with ſugar, but the Orientals uſe it without the addition of ſugar or milk. However, the Japaneſe are ſaid to prepare their liquor a ſomewhat different way, viz. by pulverizing the leaves, ſtirring the powder in hot water, and drinking it as we do coffee. From the account given by Du Halde, this method is not peculiar to the Japaneſe, but is alſo uſed in ſome provinces of China.

The common people, who have a coarſer tea, boil it for ſome time in water, and make uſe of the liquor for common drink. Early in the morning, the kettle, filled with water, is regularly hung over the fire for this purpoſe, and the tea is either put into the kettle encloſed in a bag, or by means of a baſket of proper ſize preſſed to the bottom of the veſſel, that there may be no hindrance in drawing off the water. The Bantsjaa tea only is uſed in this manner, whoſe virtues, being more fixed, would not be ſo fully extracted by infuſion.

The Chineſe are always taking tea, eſpecially at meals: it is the chief treat wherewith they regale their friends. The moſt moderate take it at leaſt thrice a-day;

others ten times, or more; and yet it is computed the conſumption of tea among the Engliſh and Dutch is as great in proportion as among the Orientals.

With regard to the commercial hiſtory of tea, we may obſerve that it was firſt introduced into Europe by the Dutch Eaſt-India company, very early in the laſt century, and that a quantity of it was brought over from Holland by Lord Arlington and Lord Oſſory about the year 1666, at which time it was ſold for ſixty ſhillings a-pound. But it appears, that before this time, drinking of tea, even in public coffee-houſes in this country, was not uncommon; for, in 1660, a duty of fourpence per gallon was laid on the liquor made and ſold in all coffee-houſes.

The preſent conſumption of it is immenſe. In 1785 it was computed that the whole quantity of tea imported into Europe was about nineteen millions of pounds, of which it is conjectured that twelve millions were conſumed in Great Britain and its dependencies. Sir George Staunton informs us, that the annual public ſales of teas, by our Eaſt-India Company, did not, in the beginning of the eighteenth century, much exceed fifty thouſand pounds weight, independently of what little might be then perhaps clandeſtinely imported. The company's annual ſales now approach to thirty millions of pounds; being an increaſe of ſix hundred fold in leſs than one hundred years, and anſwers to the rate of more than a pound each, in the courſe of the year, for the individuals of all ranks, ſexes, and ages, throughout the Britiſh dominions in Europe and America. Taking an average of ſeven years before the commutation-act, which took effect in September 1784, the importation of teas was 17,662,115lb. and, taking an average of the ſame number of years from 1784 incluſive, it amounted to 30,691,971lb. The importation is now about 40,000,000lb. of which ten millions are exported.

As to the properties of tea, they are ſtrangely controverted; the eaſtern nations are at leaſt as much poſſeſſed with an idea of their extraordinary virtues as the Europeans; but it is, perhaps, becauſe imagination bears as great a ſway there as here. The reaſon why the gout and ſtone are unknown in China, is aſcribed to the uſe of this plant.

Tea is extolled as the greateſt of all medicines. Moderately and properly taken, it acts as a gentle aſtringent and corroborative; it ſtrengthens the ſtomach and bowels, and is good againſt nauſeas, indigeſtions, and diarrhœas. It acts alſo as a diuretic and diaphoretic. The immoderate uſe of it, however, has been very prejudicial to many, who have been thereby thrown into the diabetes. And thus the infuſions of tea-leaves have been extravagantly condemned by ſome, and commended by others. From the contradictory opinions even of medical writers on this ſubject, the natural inference ſeems to be, that they poſſeſs neither noxious nor beneficial powers in any very conſiderable degree. They ſeem, when moderately

moderately uſed, to be for the moſt part innocent; in ſome caſes they ſeem to be ſalutary; in ſome they are apparently prejudicial. They dilute thick juices, and quench thirſt more effectually, and paſs off by the natural emunctories more freely, than more watery fluids; they refreſh the ſpirits in heavineſs and ſleepineſs, and ſeem to counteract the operation of inebriating liquors.

From their manifeſt aſtringency they have been ſuppoſed to ſtrengthen and brace up the ſolids; but this effect experience does not countenance, as it is in diſorders and in conſtitutions wherein corroborants are moſt ſerviceable that the immoderate uſe of tea is peculiarly hurtful; as in cold indolent habits, cachexies, chloroſis, dropſies, and debilities of the nervous ſyſtem.

Dr. Lettſom has particularly enquired into the medical qualities and effects of tea; and, having obſerved that infuſions of bohea and green tea contribute to preſerve ſweet ſome ſmall pieces of beef immerſed in them, he infers that they poſſeſs an antiſeptic power, when applied to the dead animal fibre; and from their ſtriking a purple colour with ſalt of iron he deduces their aſtringent quality. From other experiments he concludes, that the activity of tea chiefly reſides in its fragrant and volatile parts; and that, if the uſe of it be beneficial or injurious to any particular conſtitution, it becomes ſo principally by means of this odorous fragrant principle. He apprehends that it is the ſafeſt courſe to uſe the infuſion of the more ordinary kinds of this plant, which abound leſs with this fragrant principle. Or the tea may be boiled a few minutes in order to diſſipate this volatile part, which ſtands charged as the cauſe of thoſe nervous affections that are ſaid to be produced, or aggravated, by the uſe of this liquor. By this proceſs may likewiſe be extracted more copiouſly the more fixed, bitter, and ſtomachic, parts of this vegetable. Dr. Lettſom, who ſeems to be thoroughly perſuaded of the occaſionally-noxious effects of this volatile principle, in the finer teas eſpecially, recommends this laſt-mentioned mode of making tea, or the ſubſtitution of the extract inſtead of the leaves; by the uſe of which, the nervous relaxing effects, which follow the drinking of tea in the uſual manner, would be in great meaſure avoided. This extract has been imported hither from China, in the form of ſmall cakes, not exceeding a quarter of an ounce each in weight, ten grains of which might ſuffice one perſon for breakfaſt: but it might eaſily be made here by ſimple decoction and evaporation, by thoſe who experience the noxious qualities of the volatile principles of this plant.

It may be farther obſerved, that the effect of drinking large quantities of any warm aqueous liquor would be to enter ſpeedily into the courſe of circulation, and paſs off as ſpeedily by urine or perſpiration, or the increaſe of ſome of the ſecretions. Its effects on the ſolid parts of the conſtitution would be relaxing, and thereby enfeebling. If this warm aqueous fluid were taken in conſiderable quantities,

tities, its effects would be proportionable; and ſtill greater, if it were ſubſtituted inſtead of nutriment. The infuſion of tea, however, has theſe two peculiarities. It is not only poſſeſſed of a ſedative quality, but alſo of a conſiderable aſtringency; by which the relaxing power, aſcribed to a mere aqueous fluid, is in ſome meaſure corrected on this account. It is, perhaps, leſs injurious than many other infuſions of herbs, which, beſides a very ſlight aromatic flavour, have very little, if any, ſtypticity, to prevent their relaxing debilitating effects.

So far, therefore, tea, if not too fine, if not drunk too hot, nor in too great quantities, is perhaps preferable to any other known vegetable infuſion. And if we take into conſideration, likewiſe, its known enlivening energy, our attachment to it will appear to be owing to its ſuperiority in taſte and effects to moſt other vegetables.

Tea may be conſidered as a very powerful aphrodiſiac; and accordingly a phyſician of conſiderable eminence in his profeſſion, imputes the amazing population of China, amongſt other cauſes, to the general uſe of it.

Various Acts of Parliament on the Subject of Tea.—No tea is allowed to be imported, except from the place of its growth, on pain of forfeiture, 11 Geo. cap. 30. and by 24 Geo. III. cap. 38. all the duties upon tea imported, ſold, or uſed, in this kingdom ſhall ceaſe from September 15, 1784, at which period the Eaſt-India company is diſcharged from the payment of duties on tea in their warehouſes; and afterwards there ſhall be paid a duty of 12l. 10s. per cent. computed upon the groſs prices, for all tea delivered by the company to the purchaſers, which duty ſhall be drawn back on exportation to any place where the drawback is already allowed. The company is required to make four ſales in the year, and to ſell ſuch quantity as ſhall be ſufficient to ſupply the demand, provided an advance of 1d. per lb. be bid upon the prices at which the teas ſhall be put up; and, at the four firſt ſales after paſſing the act, theſe prices ſhall not exceed the following rates, viz. for bohea tea 1s. 7d. per lb. for congo tea 2s. 5d. per lb. for ſouchong tea 3s. 3d. per lb. for ſinglo tea 3s. 3d. per lb. and for hyſon tea 4s. 11d. per lb. and afterwards the whole price at which the teas are put up ſhall not exceed the prime coſt, with the freight and charges of importation, lawful intereſt from the time of the arrival of ſuch tea in Great Britain, and the common premium of inſurance. In lieu of the duties on tea, this act ſubſtitutes an additional duty on windows.

No drawback ſhall be allowed on tea exported, except to Ireland, when the whole duty on importation ſhall be allowed. 18 Geo. II. cap. 26. 17 Geo. III. cap. 27.

Every perſon having in his cuſtody more than ſix pounds weight of tea is a dealer; and ſelling without a licence, to be had for 12d. ſhall forfeit 5l. a month. 11 Geo. cap. 30. 15 Geo. II. cap. 11. Every perſon dealing in tea, &c. ſhall cauſe to be painted or written over the door of his ſhop, the words, "Dealer in Coffee, Tea, Cocoa-

Cocoa-nuts, or Chocolate," on pain of 200l. 19 Geo. III. cap. 69. And any dealer, buying of any perſon who has not this inſcription, incurs a forfeiture of 100l. and any other perſon 10l. By 20 Geo. III. cap. 35. no perſon ſhall trade in coffee, tea, or chocolate, without a licenſe, at the price of 5s. under penalty or 20l. More than ſix pounds of tea cannot be removed without a permit. 10 Geo. cap. 10. The adulteration of tea is ſubject to a penalty of 100l. beſides the forfeiture of the ſame, and for every pound of dyed leaves of tea, 5l. 11 Geo. cap. 30. 17 Geo. III. cap. 29.

VERVAIN. Verbena.

THIS herb is deſcribed, with a plate, in the Herbal, p. 381; but, as it has lately come into great repute in the cure of the ſcrophula or king's evil, I cannot make this Appendix complete without giving ſome account of its uſe in that dreadful diſorder.

Take a piece of freſh common purple vervain-root, about three or four inches long, and about the ſize of the patient's little finger, if a man or woman; to young children and infants, as large as their thumb, and ſo in proportion, but not leſs; becauſe it ſhrinks much, and contains but little virtue. All the fibres are to be cut off ſmooth, and as little of the rind as poſſible: to be worn always at the pit of the ſtomach, tied with a yard of white ſatin ribbon, half an inch wide, round the neck of men and women of an ordinary ſtature: if taller, an ell will be wanting; and children in proportion; but no other coloured ribbon is proper; becauſe the dye in ſome colours may be prejudicial. The root muſt never be wetted, not when freſh gathered, but wiped clean with a dry cloth. It muſt not be ſown up, or covered with any thing, but always worn naked at the pit of the ſtomach. If, after wearing, the ends of the fibres ſtick out and hurt and prick the ſtomach, they muſt be cut off with a ſharp knife as at firſt. When it has been worn a few days it will ſhrink, by the heat of the ſtomach; then the ribbon muſt be tied faſter. Obſerve the root be not decayed or rotten, but freſh and green, when applied; and it is neceſſary to have a freſh one every ſpring and fall.

The ſores ſhould be waſhed, night and morning, with a lotion compoſed of vinegar one-third, red port one-third, and diſtilled vervain-water one-third. If the diſtilled vervain-water cannot be ſo eaſily procured, the infuſion of the leaves may be uſed; that is, boiling water poured upon the herb, like tea, and covered, may be uſed, when cold, in its ſtead. The ſores, after waſhing, ſhould be dreſſed with an ointment made of green vervain-leaves mixed with a fourth part of houſeleek-leaves, boiled in pork lard till of a good conſiſtence, and the watery part waſted.

WURZEL MANGEL, OR ROOT OF SCARCITY. BETA.

THIS root in time of ſcarcity affords to mankind a ſalutary and agreeable food; and, when fodder is dear, preſents, both in ſummer and winter, a copious and cheap nouriſhment for cattle; which in all ſeaſons as well as in all lands, has an abundant and certain produce; and of which the culture is ſimple, the harveſt and preſervation eaſy.

This root is not to be claſſed either among turnips or carrots; and, although in its exterior and ſeed it reſembles beets, it is much ſuperior to theſe plants in every reſpect, and ſeems to be a diſtinct genus, though commonly ſet down as a variety of the Beta cycla, or white garden-beet. Its culture is ſo eaſy, its advantages ſo numerous, ſupplying as it does the want of other food, that I think it deſerves not only to be adopted every-where, but to be preferred to all other roots with which cattle are fed, even in the moſt plentiful years. It is planted in open and fallow ground; and ſucceeds well in all, and eſpecially in moiſt and light lands. If in a ſtiff and clayey ſoil, where it cannot deepen its fibres, it ſtretches horizontally, and grows as large outwardly as it would inwardly were it not obſtructed by the compactneſs of the ſoil.

This precious root is not ſenſible of the viciſſitude of the ſeaſons: it has no deſtructive enemy; the all-ſpoiling vine-fretter does not bite it; no other inſect hurts it: mildew never affects it; nor is its vegetation ever impeded by the drieſt ſummer. It does not impoveriſh the ſoil which nouriſhes it; on the contrary, it prepares it for receiving ſeeds of every other kind afterwards.

In the months of March and April, the land being well prepared, manured, and made light, the largeſt and ſoundeſt ſcarcity-root ſeeds muſt be choſen, ſteeped in water for twenty-four hours, and then dried a little, ſo that they may be handled.

Lay the line upon the field, as if you were to plant roots, at the diſtance of nineteen inches, on each ſide; make with your finger holes one inch deep, in each of which put one grain only, which cover immediately with earth. After ten or twelve days, it will ſhoot, and every grain will have four, five, or ſix, roots growing together. As ſoon as theſe ſmall roots ſhow their fourth leaf, the feebleſt of them muſt be carefully plucked off, and the fineſt and moſt vigorous root only left. In a little time the growth of the roots thus ſelected will be aſtoniſhing; not one will fail. After this manner, equally ſimple and eaſy, you avoid the tranſplanting of the roots, and obtain leaves four or five weeks ſooner; the roots grow finer and larger, and deepen better; and, in a light land, much labour is ſaved.

As the roots naturally grow a little above the ground, you muſt notice thoſe which do not ſo appear, and bare them by removing the earth from around their top. Sow the remains of your ſeed at random, that you may tranſplant the roots where

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you pleaſe. If you chooſe to leave theſe in the ſame place, they muſt be thinned and dug round early: but this is very troubleſome, and the roots planted thus never grow ſo large as thoſe whoſe ſeed has been ſet. Experience has proved this difference.

At the latter end of June, or in the beginning of July, when the outer leaves are about one foot long, the firſt gathering of them is to be made, by breaking them round and cloſe to the root. For that purpoſe you lean your thumb on the inſide, and at the very bottom of the leaf. You muſt take care not to leave a ſtump, and to gather only the leaves which incline to the ground, always ſparing thoſe of the heart of the plant; they then are re-produced, and grow faſter.

Immediately after the firſt gathering, the ground round the root is to be again dug with a mattock; in which operation the ſurface of the ground muſt be removed from the top of the roots with a wooden ſpatula, ſo that every root may be uncovered about two inches, which then ſeems to be planted in a kind of baſon nine or ten inches in diameter. A child may eaſily do this. In light lands it ſuffices to grub the weeds, and uſe well the ſpatula. After this ſecond very important operation, there is nothing more to be done, but to uſe the leaves at pleaſure. From this moment the roots begin to ſtretch and grow wonderfully. Be careful to deſtroy all groſs weeds, which partake of their nutrition; and give them the advantage of the open air, when they may be left to their own inconceivable vegetation.

In a good ſoil the leaves of theſe roots may be gathered every twelfth or fifteenth day. I have often remarked, that the leaves grow to the length of nearly two inches and a half, and to the breadth of one inch and a half, within twenty-four hours; and, at the ſecond gathering, they are twenty-eight and thirty inches long, and twenty or twenty-two broad. This account may appear exaggerated till experience prove the truth of it.

Oxen, other cattle, and ſheep, are fond of theſe leaves, with which they are eaſily fed and fattened to the greateſt advantage, eating them whole, as they are brought from the field; but for poultry they muſt be minced and mixed with bran. They are alſo very good nouriſhment for horſes during the ſummer; for this purpoſe they need only be minced with that kind of knife which I ſhall hereafter deſcribe, and mixed with cut ſtraw. Swine alſo eat them very heartily.

The leaves of ſcarcity-root afford alſo a wholeſome and pleaſant food for man. The ſtalks of them are eaten like thoſe of beets, but have not the ſame earthy taſte. They may be prepared in different manners: when dreſſed like ſpinage, many prefer them to it. By the continual ſucceſſion of their production, from ſpring to the month of November, they are very uſeful to farmers, and all others who maintain a great number of ſervants. In winter-time the roots are eaten, dreſſed alſo different ways; they are wholeſome, of an agreeable taſte, much ſuperior to the red-beet, and

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at leaſt equal to the turnip. The leaves produced by the roots when preſerved in a cellar, during the winter, are very ſoft and delicate.

The approach of ſevere froſts ſhows the time for getting-in the roots. This precious harveſt muſt be made in fine weather, though it be a few days ſooner than otherwiſe neceſſary, as the preſervation of the roots depends very much on their being houſed dry. The roots muſt be plucked early in the morning, and left expoſed to the air and ſun; children go behind the perſon who plucks them, and cut the leaves to the heart; an operation which may as well be performed one or more days before the harveſt. In the evening the roots muſt be collected together, and, if ſufficiently dried, lodged in a place well ſecured againſt ſevere froſts. If there is nothing to be apprehended from rain, thoſe which have been plucked in the evening may be left in the field, and carried home next day. It is beſt to leave them expoſed to the air for two or three days, when the weather will permit. As their ſkin is very thin, they muſt be handled ſoftly, and great care taken not to bruiſe them, which would be prejudicial to their preſervation.

The harveſt-time is preciſely that wherein the roots proper for bearing ſeed ſhould be fixed upon; and thoſe are the beſt for the purpoſe which have attained only to a middle ſize, are ſmooth and even, roſy on the outſide, and white or marbled white-and-red within. Such is the deſcription of the roots which ought to be preſerved for cultivation. Thoſe which are entirely red or entirely white, are either roots degenerated, or the real red-beets, whoſe ſeeds have not been carefully diſtinguiſhed by the ſower. It is neceſſary to ſeparate, and ſhelter from all moiſture and froſt, the roots which are deſigned for ſeed.

In the beginning of April, thoſe roots which have been ſet apart for ſeed muſt be planted in the open field, three feet diſtant from each other. As their ſtems grow five or ſix feet high, they muſt be kept up with props ſeven feet long, placed a foot and a half in the ground, with ſmall rods between them, in order to form a kind of trellis, to which the ſtems are tied, as they grow up, to prevent their being broken by the wind.

The ſeed ordinarily ripens towards the latter end of October: it muſt be gathered immediately after the firſt hoar-froſts. The ſtems are then cut, and placed againſt a wall or paliſade, if the weather permits; if not, they are tied in ſmall bundles, and hung up in a ſheltered airy place, till they are quite dry. At laſt the ſeed is taken and preſerved in bags, like others of the kitchen-garden.

The ſeed of the ſcarcity-root degenerates, like all others, if the ſoil is not changed every year, or every two years. Care muſt be taken, therefore, to ſow in a ſtiff ſoil that ſeed which has been grown in a light or ſandy ſoil; and in light ſoil, that which has been grown in a ſtrong and compact ſoil. Thus thoſe who cultivate

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ſuch or ſuch lands may be of great ſervice to one another by making annual exchanges. This ſeed preſerves all its qualities for three or four years.

If the quantity of the roots you intend to preſerve is too great to be lodged in the houſe, ſome days before they are pulled pits ſhould be dug in the field, or any other place that is ſheltered from water during the winter. After the inſide of theſe pits has been left to dry for eight or ten days, their bottom and ſides muſt be covered with a ſmall quantity of ſtraw, and the roots afterwards be placed regularly one by one, taking care not to bruiſe them, and to clean them well from the particles of their natural ſoil. Then let the upper roots be over-laid with ſtraw, which is to be covered three feet deep with the earth dug from the pit; and this earth muſt be hard beaten, and diſpoſed in a ſloping manner, that the water may eaſily flow off.

The dimenſions of the pits ought to be proportioned either to the riſing of the ground, or to its declivity. They may be from two to three feet deep. Their length depends on the quantity of roots which are to be placed in them, but their breadth is commonly three feet and a half.

Theſe roots poſſeſſing the valuable quality of being capable of preſervation till the month of June without the leaſt alteration, it will not be amiſs to multiply the pits, and to make one for each month, beginning in March, when the winter-proviſion is ordinarily over. The reaſon for this advice to multiply the pits is, becauſe, if the roots, after having been deprived of the action of the air, are expoſed to it anew, they do not preſerve their freſhneſs long. The multiplying of the pits will prevent this inconvenience.

Every pit abſolutely requires an air-hole, through which the fermentation of the roots may evaporate; for without this precaution all the roots you intend to preſerve under the earth will rot. The air-hole muſt be made in the following manner:---Before any thing is put into the pit, a pole ſix or ſeven feet long, and two inches in diameter, muſt be planted in the middle of it; then place therein the roots, and diſpoſe them in a ſloping direction. When the pit is full, and the roots are half a foot above the level of the ground in the middle part, twiſt a rope of hay about an inch thick round the pole, taking care not to bind it too hard. After that is done, throw on the earth, and diſpoſe and beat it as before-mentioned. When the pit is quite covered, take out the pole; the hay will remain in the hole, through which the exhalation ariſing from the fermentation of the roots will paſs. After ſome days, the hole muſt be covered with a pan-tile, and, on the approach of ſevere cold, ſhut quite cloſe with a flat ſtone.

That cattle of every kind may eat the roots, they muſt be cut or minced, after they have been waſhed and cleaned; which is done with a kind of knife, i. e. a blade of iron, one foot long and two inches broad, bent like an S, to the middle of which

is ſoldered a ſocket about ſix inches long. In this ſocket is fixed a wooden handle, about three feet ſix inches long. With this knife, which at firſt ſight ſeems intended for printing the letter S, the roots are minced as equally as eaſily. This operation is performed in a bucket or trough uſed for that purpoſe only. A ſingle man in one hour is able to mince a quantity of roots ſufficient to feed twelve oxen a whole day. Before the roots are put into the trough, they muſt be cut in large pieces. It will be beſt to mince them as ſmall as a walnut.

The roots, being prepared as above, may, without being mixed with any other food, be given to horned cattle and ſheep, and eſpecially to thoſe which are to be fattened: but, if it is neceſſary to be ſparing of the roots, they may be mixed with one-fourth part or more of hay and minced ſtraw. It is even proper to obſerve that method during the three or four firſt weeks, with reſpect to lean cattle, which are meant to be fattened. Dry trefoil, ſaintfoin, &c. are beſt for this uſe. Thoſe who have a hay-knife for cutting dry fodder, of the ſame ſort with that uſed in Germany with ſo much ſucceſs and advantage, will ſave much time, and conſume leſs of their proviſion.

Horſes may be fed, during the winter, with the ſcarcity-roots, by adding to them one half of hay and ſtraw minced together, which will make them healthy, fat, and vigorous. But in the ſeaſon of hard and conſtant labour, a ſmall quantity of oats muſt, from time to time, be added. This is the practice in thoſe provinces of Germany where the ſcarcity-roots ſerve almoſt inſtead of meadows, and of which the horſes are well known and eſteemed.

Swine eat theſe roots very well, raw, minced, and mixed in their greaſy or milky drink. They become as fat as thoſe which are fed with potatoes, which require to be boiled. By the uſe of this root, the expenſe of wood and coals, as well as the trouble of boiling, &c. is ſaved.

Beſides the advantages which have been already enumerated, the ſcarcity-roots afford many others; amongſt which, in particular, is the certainty of an abundant harveſt, whatever may be the intemperature of the ſeaſons.

If the culture of this root is adopted, it will no more be neceſſary to let the graſs of the natural or artificial meadows be eaten by cattle during the ſummer; all which will, therefore, be converted into hay. How great, then, will be the quantity of hay to be ſold, ſince, during the winter, more than two-thirds of it will be ſaved! And, as the roots facilitate the feeding cattle in the ſtables for the whole year, the quantity of dung, ſo neceſſary to agriculture, will be increaſed.---When this root ſhall be well known to the farmers, there is no doubt but they will prefer it to all other fodder of the like kind.

TABLES

TABLES and INSTRUCTIONS for GATHERING HERBS and PLANTS in the PLANETARY HOUR.

TABLE No. I.

To find the Beginning and End of the Planetary Hour by Day for ever.

Place of the ☉	Hours from Sun-rise to Noon.							Hours from Noon to Sun-set.						Place of the ☉
	0	1	2	3	4	5	6	7	8	9	10	11	12	
SignD	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	SignD
♈ 0	6 0	7 0	8 0	9 0	10 0	11 0	12	1 0	2 0	3 0	4 0	5 0	6 0	♍ 30
3	5 54	6 55	7 56	8 57	9 58	10 59	12	1	2	3	4	5	6	27
6	47	47	51	54	56	58		2	4	6	9	11	13	24
9	41	44	47	51	54	57		3	6	10	13	16	19	21
12	35	39	43	48	52	56		4	8	13	17	21	25	18
15	28	33	39	44	49	55		5	11	16	21	27	31	15
18	22	28	35	41	47	54		6	13	19	25	32	38	12
21	16	23	31	38	45	53		7	15	22	29	37	44	9
24	10	18	27	35	43	52		8	17	25	33	42	50	6
27	3	13	22	32	41	51		10	19	29	38	48	57	3
♉ 0	4 57	8	18	29	39	50		11	21	32	42	53	7 3	♎ 0
3	51	3	14	26		49		12	23	35	46	58	9	27
6	45	5 58	10	23		48		13	25	38	50	6 4	15	24
9	40	52	7	20		47		13	27	40	53	7	20	21
12	34	48	3	17		46		14	29	43	57	12	26	18
15	28	42	6 59	14		45		15	31	46	5 1	17	31	15
18	23	39	55	12		44		16	32	49	5	21	37	12
21	18	35	52	9		43		17	34	51	8	25	41	9
24	12	30	48	6		42		18	36	54	12	30	48	6
27	8	27	45	4		41		19	37	56	15	33	52	3
♊ 0	2	23	42	2		41		20	39	59	18	38	57	♌ 0
3	3 59	19	39	0		40		20	40	1	21	41	8 1	27
6	55	16	37	7 58		39		21	42	3	23	44	5	24
9	51	13	34	56		39		22	43	5	26	48	9	21
12	48	10	32	54		38		22	44	6	28	50	12	18
15	45	8	30	53		38		23	45	8	30	53	15	15
18	43	6	29	52		37		23	46	9	33	54	17	12
21	41	4	27	51		37		23	46	10	32	56	19	9
24	40	3	27	50		37		23	47	10	33	57	20	6
27	39	2	26	50		36		24	47	11	34	58	21	3
30	38	1	25	49		36		24	47	11	35	58	22	♎ 0

TABLE No. II.

To find the Beginning and End of the Planetary Hour by Day for ever.

Place of the ☉.	Hours from Sun-rise to Noon.							Hours from Noon to Sun-set.						Place of the ☉.
	1	2	3	4	5	6	7	8	9	10	11	12	
Sign D	H. M.	H. M.	H. M.	H. M.	H. M.	H.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	Sign D
♎ 0	6 0	7 0	8 0	9 0	10 0	11 0	12 1 0	2 0	3 0	4 0	5 0	6 0	♓ 30
3	6	5	4	3	2	1	0 59	1 58	2 57	3 56	4 55	5 54	27
6	13	11	9	7	4	2	58	1 56	54	51	49	47	24
9	19	16	13	10	6	3	57	1 54	51	47	44	41	21
12	25	21	17	13	8	4	56	50	48	43	39	35	18
15	32	24	21	16	11	5	55	49	44	39	33	28	15
18	38	30	25	19	13	6	54	47	41	35	28	21	12
21	44	37	29	22	15	7	53	45	38	31	23	16	9
24	50	42	33	25	17	8	52	43	35	27	18	10	6
27	57	48	38	29	19	9	51	41	31	23	13	3	3
♏ 0	7 3	53	42	32	21	10	50	1 39	29	18	8	4 57	♈ 0
3	9	58	46	35	23	11	49	1 37	26	14	3	51	27
6	15	8 3	50	38	25	12	48	35	23	10	3 58	45	24
9	20	7	53	40	27	13	47	33	20	7	53	40	21
12	26	12	57	43	29	14	46	31	17	3	48	34	18
15	32	17	9 1	46	31	15	45	29	14	2 59	43	28	15
18	37	21	5	49	32	16	44	28	12	55	39	22	12
21	42	25	8	51	34	17	44	26	9	52	35	18	9
24	48	30	12	54	36	18	43	1 24	6	48	30	13	6
27	52	33	15	56	37	19	41	23	4	45	27	8	3
♐ 0	57	38	18	59	39	20	41	21	2	42	23	3	♒ 0
3	8 1	41	21	10 1	40	20	40	20	0	39	19	3 59	27
6	5	44	23	2	41	21	39	18	1 57	36	15	55	24
9	9	48	26	4	42	22	39	17	56	34	13	51	21
12	12	50	28	6	44	22	38	16	54	32	10	48	18
15	15	53	30	8	45	23	38	1 15	53	30	8	45	15
18	17	54	31	9	45	23	37	14	51	28	5	43	12
21	19	56	33	10	46	23	37	14	51	27	4	41	9
24	20	57	33	10	47	23	37	1 13	50	27	3	40	6
27	21	58	34	11	47	23	37	13	50	26	2	39	3
30	22	58	35	11	47	24	36	13	49	25	2	38	♍ 0

TABLE No. III.

To find the Planetary Hours for every Day in the Week, beginning at Sun-rising.

Sunday.		Monday.		Tuesday.		Wednesd.		Thursday.		Friday.		Saturday.	
Planets	H	Planets	H	Planets	H	Planets	H	Planets	H	Planets	H	Planets	H
☉	1	☽	1	♂	1	☿	1	♃	1	♀	1	♄	1
♀	2	♄	2	☉	2	☽	2	♂	2	☿	2	♃	2
☿	3	♃	3	♀	3	♄	3	☉	3	☽	3	♂	3
☽	4	♂	4	☿	4	♃	4	♀	4	♄	4	☉	4
♄	5	☉	5	☽	5	♂	5	☿	5	♃	5	♀	5
♃	6	♀	6	♄	6	☉	6	☽	6	♂	6	☿	6
♂	7	☿	7	♃	7	♀	7	♄	7	☉	7	☽	7
☉	8	☽	8	♂	8	☿	8	♃	8	♀	8	♄	8
♀	9	♄	9	☉	9	☽	9	♂	9	☿	9	♃	9
☿	10	♃	10	♀	10	♄	10	☉	10	☽	10	♂	10
☽	11	♂	11	☿	11	♃	11	♀	11	♄	11	☉	11
♄	12	☉	12	☽	12	♂	12	☿	12	♃	12	♀	12
♃	13	♀	13	♄	13	☉	13	☽	13	♂	13	☿	13
♂	14	☿	14	♃	14	♀	14	♄	14	☉	14	☽	14
☉	15	☽	15	♂	15	☿	15	♃	15	♀	15	♄	15
♀	16	♄	16	☉	16	☽	16	♂	16	☿	16	♃	16
☿	17	♃	17	♀	17	♄	17	☉	17	☽	17	♂	17
☽	18	♂	18	☿	18	♃	18	♀	18	♄	18	☉	18
♄	19	☉	19	☽	19	♂	19	☿	19	♃	19	♀	19
♃	20	♀	20	♄	20	☉	20	☽	20	♂	20	☿	20
♂	21	☿	21	♃	21	♀	21	♄	21	☉	21	☽	21
☉	22	☽	22	♂	22	☿	22	♃	22	♀	22	♄	22
♀	23	♄	23	☉	23	☽	23	♂	23	☿	23	♃	23
☿	24	♃	24	♀	24	♄	24	☉	24	☽	24	♂	24

To find what Planet rules any Hour of the Day by the Table No. III.

LET it be obſerved, aſtrological hours are regulated by the motion of the ſun both in ſummer and winter; and the ſpace of time which is contained from ſun-riſe to ſun-ſet is divided into twelve equal parts, whereof the one half contains the hours before noon, the reſt the hours after noon. So alſo the ſpace of time from ſun-ſet till ſun-riſe is divided into twelve parts; theſe hours are unequal, conſiſting of more or leſs than ſixty minutes, as the ſun recedes from ♈ or ♎, as will be ſeen by example by the foregoing Table.

The ſeven planets are attributed by the ancients to preſide over the ſeven days of the week, and each of them rules over the firſt hour of each day, as may be ſeen by the Table. The firſt planetary hour of Sunday is the Sun, the ſecond is Venus, and ſo on; the firſt planetary hour of Monday is the Moon, the ſecond is Saturn; and the ſame is to be obſerved of the other days.

The uſe of theſe Tables will appear by bare inſpection, as they require no ſort of calculation, but a perſon of the meaneſt capacity will be able to underſtand them. The reaſon of their being placed in this manner, in the form of Tables, is, becauſe no Herbals which ſpeak of the force and power of planetary influx, and the neceſſity of gathering herbs for medical uſe under the planet which principally governs them, have laid down any rule whereby any herbariſt may know when thoſe planetary hours are, and conſequently could not know the fit time to gather them. This deficiency has not only occaſioned much uneaſineſs in the minds of many medical gentlemen, but has much prevented the progreſs of cures, and many diſorders have been deemed incurable from not making uſe of the preciſion which is abſolutely neceſſary for the perfection of ſome cures.

Theſe Tables are ſo calculated, as by bare inſpection to point out thoſe beautiful times, when man, who is endowed with a rational ſoul derived from the centre, is able, by expanding itſelf into the circumference of this outward nature, ſo to hit upon the hour, not only in gathering of herbs, roots, &c. but to adminiſter them in a time correſponding thereunto, and thereby force from the patient the offending matter that robs him of the moſt invaluable bleſſing of health. But, as I intend not this as a treatiſe, but as a ſmall part of the Key to Phyſic, I ſhall therefore paſs over all obſervations on the ebb and flow of all ſublunary virtues in terrene things, and only ſay, that truth needs not many words to recommend it, but will demonſtrate itſelf by trial; ſo theſe Tables, and the reſt of this little Key, will prove to the afflicted patient, or to the compaſſionate phyſician, the legitimate offspring of TRUTH and EXPERIENCE.

EXAM-

EXAMPLE I.

To find the planetary hour on Sunday, the 22d of April, 1792, at half-paſt ten o'clock in the morning.—I examine in the Ephemeris what degree the Sun is in, and find on that day at noon he is in three degrees of the ſign Taurus; with this degree I enter the Table No. I. and ſeek three degrees of ♉ in the firſt column, and, by running even in the columns, in the ſeventh column I find 10h. 49m. which ſhows me, if I look on the top of the Table, that the fifth planetary hour would finiſh at forty-nine minutes paſt ten o'clock in the morning. Now I refer to the former column, and find the fifth planetary hour began at thirty-ſeven minutes paſt nine o'clock; and, as the time I entered was 10h. 30m. in the morning, and it being between 9h. 37m. and 10h. 49m. it proved it to be the fifth planetary hour. To know what planet ruled this hour, I enter the Table No. III. and, counting down the planets in the firſt column under the word Sunday, find the fifth planetary hour on that day to be Saturn; if it had been on a Monday, the fifth planetary hour would have been the Sun; on a Tueſday, it would have been the Moon; on a Wedneſday, Mars; and ſo on; by which rule may be found the planetary hour for any day of the week.

EXAMPLE II.

We will ſuppoſe that we want to find the hour of Venus on Saturday, the 19th of January, 1793.---I look into the Ephemeris, and find the Sun at noon on that day is in deg. 0♒. I enter the Table marked No. III. and, in the column of the planetary hours under Saturday, I find the fifth hour is under Venus; now, as the Sun is in 0 deg. of Aquaries, I enter the Table No. II. in the right-hand column with 0♒, and in the ninth column on the left hand I find the planetary hour of Venus began twenty minutes paſt eleven o'clock, and continued till noon on that day.

Such was the mode of practice, when nature only was conſulted, and the intention really to make a cure, without a view to gain: then diſeaſe was but little known, and people lived to a good old age.

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GENERAL DIRECTIONS TO THE BINDER.

LET the Plates belonging to the APPENDIX be placed as nearly opposite to the description of each plant as circumstances will allow; observing never to place two cuts together, but to turn over the next leaf, so as to have one leaf of letter-press between them.

DIRECTIONS FOR BINDING THE KEY AND CULPEPER TOGETHER.

Let the APPENDIX be placed at the End of CULPEPER's BRITISH HERBAL, which will complete the first Volume; and at the End of the MEDICAL PART of CULPEPER, add the KEY to PHYSIC, &c. which will divide them into two uniform Volumes, and make the whole Subject complete.—To be lettered, Dr. SIBLY's FAMILY PHYSICIAN.

DIRECTIONS for BINDING Dr. SIBLY's WORKS in FOUR VOLUMES.

LET the Sixty Numbers of the ASTROLOGY be divided into two Volumes; and the above two volumes added to them, making four in the whole; to be *double-lettered*, in the following Order, viz. The WORKS of Dr. SIBLY, to be the general Title of each Volume; then under Vol. I. is to be added, DOCTRINE of the STARS. Under Vol. II. CALCULATION of NATIVITIES. Under Vol. III. BRITISH HERBAL. Under Vol. IV. FAMILY PHYSICIAN.

Let the Portrait of Dr. Sibly be placed at the beginning of the first Vol. The Frontispiece of the Occult Sciences to front the second Vol. The Portrait of Culpeper the third Vol. And the Frontispiece of the Key, the fourth Vol.

A general Title for each Volume of Dr. Sibly's Works, to be placed before the Frontispieces, may be had gratis by those who have taken the whole in Numbers, and want to bind them uniform, by applying at the publisher's.

END OF THE APPENDIX.

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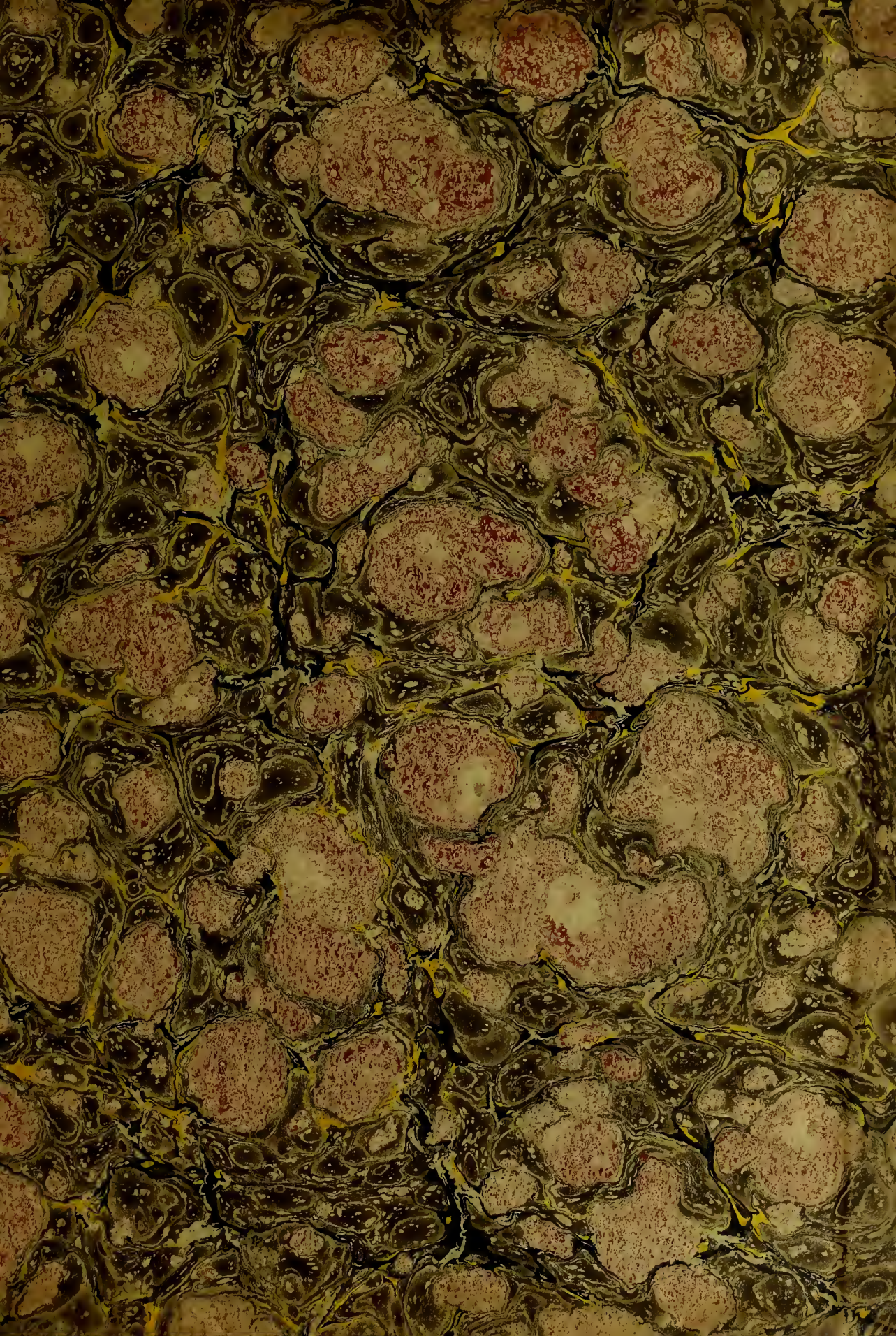
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